

THE AUTOMOBILE

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No. 14

ONE NATIONAL AUTOMOBILE SHOW.

ONE National Automobile Show that would be such in every sense of the term is a consummation that the industry as a whole would look upon with undivided approval, if the sentiment that has accumulated since the prolonged circuit came to its tardy conclusion is read aright.

There has been a surfeit of exhibitions bearing the national hallmark, and the heavy financial drain has drawn forth a remonstrance from many makers, and they are inclined to consider that the time has arrived for a single show to bear the designation of "National." Only one "National" show is desired by the trade.

self-preservation—appropriated Madison Square Garden and gave first call for space to its own members.

Of course there had to be another show for those left outside the breastworks, and the Automobile Club of America conducted it in the new Sixty-ninth Regiment Armory, capably and successfully, and with the sanction of the National Association of Automobile Manufacturers, which two organizations had managed the three previous exhibitions in the Garden.

But it is an inconvenient plan, this division of the industry, and though later at Chicago the two sides of the patent conten-

And herein exists the reason for one National show. Retailing is the province of the local dealer. The National show is held for the purpose of giving the maker opportunity to sell his product to the dealer, and this cannot be done in satisfactory manner as late as January and to the accompaniment of throngs of retail buyers and those who are only dreaming of the possibility of becoming such.

National Show Is for the Dealers.

The National show, first of all, is for the dealers, and these dealers should have a look at the new product before the public,



NEW ARMORY OF THE 65th REGIMENT AT BUFFALO, SAID TO BE THE LARGEST MILITARY BUILDING IN THE WORLD.

Success for a "National" show does not require that thousands of people shall pass through the turnstiles; attendance to the capacity of the aisles is considered detrimental, especially when this army comes mainly to look and not to buy. Therefore, this National show need not be held in New York City, which at the present time does not possess a building huge enough to encompass a complete representation of the great industry. That was why the Association of Licensed Automobile Manufacturers—acting upon the universal law of

tion were housed together, along with those who are not interested in internal-combustion engines, again two buildings were required. In both New York City and Chicago the attendance was exceptional, and the education of the public proceeded at a record pace, and many sales resulted then and there. It should be borne in mind that the two big shows had been scheduled so late that they found purchasers of new cars ready to buy as soon as suited. For local shows this idea is vital, and it should continue to be remunerative in the future.

which, as before, will do its buying when later the round of local shows is set in motion. The public of the city in which this National show is held will have the good fortune to enjoy the first look at the new models, but it could be arranged so that there would be slight interference with the business of maker and dealer.

Circumstances forced the Licensed Association into show promoting—it could not see enough space in the Garden for all, and so it looked after its own first—and the Garden company, preferring one-half to



VIEW OF INTERIOR OF 65th REGIMENT ARMORY IN BUFFALO, SHOWING DRILL HALL, 240 BY 336 FEET.

one-third, elected to have a single partner rather than two. It is presumed that with a building containing ample floor space for all, the Seldenites would favor again the running of the National show by the National Association of Automobile Manufacturers, to which would then apply for membership those of the American Motor Car Manufacturers' Association. The disposition of the patent can be left to the courts.

An October Date for the Show.

With the N. A. A. M. again representative of the whole industry, could follow the quick selection of an early show date. Even October might not be too early, and certainly arrangements could be made for November.

The place for the National show of 1906 is a comparatively easy problem, for the reason that the only available building sufficiently capacious enough is nearing completion in Buffalo—the new Sixty-fifth Regiment Armory. Buffalo, too, is near the center of the industry, is easy of access, and its hotel accommodations are to be supplemented by the giant hostleries at Niagara Falls—a half hour away—should that be necessary. A study of the weather charts of several years will tell of reassuring conditions for western New York during the latter part of October. This matter is to be considered because of the particular necessity of demonstration in selling to dealers.

Concerning Buffalo's Mammoth Armory.

The new Sixty-fifth Regiment Armory in Buffalo covers 3.4 acres of ground, and its big drill hall is 240 by 336 feet, thus containing 80,640 square feet. The basement contains nearly the same amount of space, except that it is divided in the center by the rifle range.

Built on the highest elevation in the city, and within easy reach of the business center, its availability locally is unequalled. Its walls are of white Medina sandstone, and the architecture Norman of the Eleventh Century modernized. It is claimed to be the largest armory in the world.

Madison Square Garden amphitheater

has about 35,000 square feet, though almost as much more is available by including the restaurant, basement, concert hall and galleries. The Sixty-ninth Regiment Armory has about 40,000 square feet in the drill hall, with 20,000 additional square feet available. It is estimated that the Buffalo building could supply fully 150,000 square feet in drill hall, basement and gallery, which would exceed the combined show space of both Madison Square Garden and the Sixty-ninth Regiment Armory.

NEW ORLEANS' FIRST SHOW.

NEW ORLEANS, March 31.—The automobile dealers of this city have decided that the increasing interest in automobiles and automobiling warrant the holding of an automobile show, which they hope will be the first of many successful exhibitions here.

The show will be held in Auditorium Hall from Monday, May 14, to Saturday, May 19, inclusive. A committee of the "New Orleans Automobile and Motor Show" has been appointed to take charge of the arrangements, as follows: Albert Machie, Hart Newman, Jules Godchaux, and G. Lehmann, Jr. The show is being advertised extensively and is arousing much interest in the South.

Rules and regulations similar to those governing the New York shows will be in force. The charge for space has been fixed at 75 cents a square foot, and allotments will be made in the order of receipt of applications.

Makers in the North desiring to send down exhibits can secure low rates by the steamships of the Southern Pacific line direct from New York to New Orleans, leaving Saturday, May 5. Further particulars regarding the forthcoming show can be secured by persons interested by addressing Major W. Stewart, 50 West 37th street, New York, or Gus Lehmann, Jr., 57 Leonard street, New York.

BALTIMORE SHOW OPENED.

BALTIMORE, April 2.—The first annual automobile show of the Baltimore Automobile

Dealers' Association opened at 7:30 o'clock last Saturday night in the new garage of the Motor Car Company, Mount Royal and Maryland avenues. The exhibition will close next Saturday, April 7. At least 1,000 persons attended the opening. Half a hundred automobiles were shown and more are expected before the end of the week. Beside the automobile exhibits there were many displays of parts and accessories.

The parade which was to precede the opening of the show was practically abandoned on account of a drizzling rain, which later changed to snow, and less than a dozen cars went over the scheduled route, headed by an observation car carrying a brass band. Afternoon and evening concerts by this band will occur daily during the exhibition. Considering the limited space and the fact that this is a first show, of strictly a local nature, the affair is so far commendable.

FAVORS TWO DEALERS' SHOWS.

CHICAGO, April 3.—At the recent monthly meeting of the Committee of Management of the American Motor Car Manufacturers' Association a resolution was passed unanimously favoring the holding of dealers' automobile shows, both in New York City and Chicago, which shows should be operated and managed by the local Dealers' Associations of these cities.

N. A. A. M. MONTHLY MEETING.

The National Association of Automobile Manufacturers yesterday held its monthly meeting at No. 7 East Forty-second street, New York City. The show question was one of the subjects considered.

L. A. A. M. IS IN SESSION.

The Licensed Association of Automobile Manufacturers is holding its monthly meeting to-day (Thursday), at No. 7 East Forty-second street. The show question will be discussed. The Mechanical Branch will have its session tomorrow.

DISCUSSION ON DENATURIZED ALCOHOL.

Committee on Ways and Means Reports Favorably on the Payne Free Alcohol Bill in the House—Measure Likely to Pass Congress.

A favorable report on the free (denaturized) alcohol bill was authorized by the Committee on Ways and Means in Washington last week, and the advocates of the measure are consequently very hopeful that it will pass the House. The bill has been drawn by Chairman Payne, as a result of the hearings of the committee, and it is in the nature of a substitute for other bills, having the same object, which had been introduced.

The Payne bill provides in effect that from and after three months from its passage domestic alcohol of such degree of proof as may be prescribed by the Commissioner of Internal Revenue and approved by the Secretary of the Treasury, may be withdrawn from bond without the payment of internal revenue tax, for use in the arts and industries, and for fuel, light and power, provided such alcohol shall have been mixed (in the presence of an authorized government officer, before withdrawal from the bonded warehouse) with a denaturizing material suitable to the use for which the alcohol is withdrawn, but which destroys its character as a beverage. The character and quantity of the denaturizing material and the conditions upon which the alcohol may be withdrawn free of tax are to be prescribed by the Commissioner of Internal Revenue, who shall make all necessary regulations for carrying the proposed law into effect.

A penalty of not less than \$5,000 fine or five years' imprisonment, or both, is provided for violations of the law in using such tax-free alcohol in the manufacture of any beverage or liquid medicinal preparation. An appropriation of \$250,000 is provided for carrying the proposed law into effect.

At the hearings of the Committee on Ways and Means many expert witnesses were examined as to the uses of alcohol and many interesting facts and figures were brought out. L. B. Goebbels, of the Otto gas engine works, which builds great numbers of internal combustion engines, principally for stationary purposes, said that three years ago the increasing cost of gasoline compelled the Philadelphia house concern to look for a substitute fuel, and he had made a trip to Germany to inquire into the use of denaturized alcohol.

"I had occasion to take part in several shop tests made with alcohol engines, which varied in size from 10 to 30 horsepower," he testified. "The results which we obtained showed that out of an engine of a given size—that is, a given cylinder capacity—we got an average of 20 per cent.

more power than out of the same size engine operated on gasoline. This is due to the fact that while alcohol does not have the same heating value per volume as gasoline, the proportion being about 1 to 1.6 in favor of gasoline, it is possible to get a higher efficiency from alcohol, because it can be compressed to a much higher degree without danger of spontaneous combustion than is possible with gasoline.

"The thermal efficiency, that is, the degree of utilizing all of the heating value of alcohol, is therefore much greater than that of gasoline, the figures being about 21 per cent. for gasoline as against 30 per cent. or more for alcohol.

"A 10-horsepower engine was tested in the same condition in which it had previously run on gasoline, without any change whatever. It developed 11 brake horsepower, as against 10 horsepower with gasoline, and consumed 11-2 pints of alcohol per horsepower per hour. By increasing the compression of the engine this consumption was reduced to 1.1 pints per horsepower per hour. There was no difficulty in starting the engine on alcohol, even when cold. This was particularly important to determine, as in the German engines which I have tested it was necessary to start the engine on gasoline and turn on the alcohol after the engine had warmed up, which took about two or three minutes.

"A 15 horsepower, of which I have a test record, shows similar results, the power developed being 16.5, as against 15.2 with gasoline, while the fuel consumption was 1.08 pints per brake horsepower per hour."

"A few preliminary tests were made to compare the rate of evaporation and danger of explosion of gasoline and alcohol. First, a surface about 6 inches square was covered with equal volumes of gasoline and alcohol. The alcohol took twice as long to evaporate. Second, a small quantity of gasoline in a receiver placed in any part of an iron bucket had at the end of half an hour filled the bucket with explosive mixture, so that a lighted match placed anywhere in the bucket caused an explosion. The same experiment tried with alcohol failed entirely, although the alcohol was allowed to stand a longer time. Two things tend to account for this. Even dilute mixtures of gasoline vapors and air are explosive, and gasoline vapor, being much heavier than air, diffuses upward very slowly, thus keeping the mixture near the liquid rich enough to be explosive.

Mr. Goebbels said his concern had built

a number of engines of 160 horsepower each for use in submarine boats. In connection with those for the United States Navy the question arose as to the danger of using gasoline, and a trial was made, which demonstrated that alcohol could be used in the motor without any structural change. The motor was first started on gasoline, and after a half hour's run the gasoline was shut off and alcohol turned on.

"There was no change then in the amount of power developed," continued Mr. Goebbel, "but the fuel supply valve had to be opened a little more, increasing the consumption from 0.110 gallon to 0.130 gallon per horsepower. The engine was then shut down after a two hour run, allowed to cool off, and was started on alcohol and run for another period of one hour. It was then taken apart and the cylinder valves and interior portions of the engine were carefully examined. It was shown that parts exposed to the combustion were as free from rust or sediment as they generally are when using gasoline.

"I have also examined the interior portions of alcohol engines that have been in continuous use for three years, and have found them to be in good working order, except such wear as necessarily takes place in all internal-combustion engines."

At the opening of the hearing Secretary of Agriculture James Wilson spoke in favor of the bill, and gave some figures as to the possible sources of supply of materials for producing alcohol:

"An acre of land which produces 50 bushels of corn, nearly 2,800 pounds, will furnish 1,960 pounds of fermentable matter; that is, starch and sugar together. Forty-five per cent. of this will be obtained as absolute alcohol, namely, 882 pounds. A gallon of absolute alcohol weighs 6.8 pounds; therefore an acre of corn would produce about 130 gallons of absolute alcohol. Commercial alcohol is about 95 per cent. pure, so that approximately an acre of indian corn producing 50 bushels would make about 140 gallons of commercial alcohol.

"If we assume the average crop of potatoes to be 300 bushels, or 18,000 pounds, it would produce 3,600 pounds of fermentable matter, since the potato contains an average of 20 per cent. of this material. This would produce 1,620 pounds of absolute alcohol, or about 255 gallons of commercial alcohol, showing that an acre of potatoes produces much more alcohol than an acre of corn."

By using a grade of potatoes especially for alcohol production the output could be

increased to 500 gallons of alcohol to the acre.

Commissioner of Internal Revenue John W. Yerkes, when questioned about the methods employed to denaturize alcohol, explained:

"The denaturizing material generally used is wood alcohol, and to that is added either a bone oil, which is not fragrant, or some one of the coal-tar preparations, with pyridine bases, say four parts of wood alcohol and one part of pyridine base. I understand that it is the crude wood alcohol that is used and not the refined and highly purified wood alcohol. They use a fixed quantity of these denaturizing materials, which are supposed to destroy the beverage qualities in two ways: First, by producing toxic poisoning qualities with the wood alcohol, and, second, by the disgusting flavor and perfume that you get from the thorough admixture of these elements. It is undoubtedly true that if you take alcohol in that condition, made nonpotable, it is absolutely beyond the pale of ordinary use for beverage purposes."

N. Bachelder, representing a national organization of farmers, told the committee that 2 1-2 gallons of 90 per cent. alcohol could be produced from a bushel of corn. With corn costing 30 cents a bushel, alcohol could be produced for 11 or 12 cents a gallon, and with corn at 40 cents the cost would be about 16 cents. With an average cost of the distiller of 35 to 40 cents a bushel, alcohol could be sold for 20 cents a gallon.

In the West and Northwest gasoline now sold for 20 to 25 cents a gallon. "As practically no gasoline is found in the petroleum obtained in California, Texas and other states from which the largest proportion of our oil supply is secured, and as the production of Eastern petroleum is falling off each year," he said, "it is evident that in a short time the demand for gasoline will so far exceed the supply that its cost for motor fuel purposes will be prohibitive. It is therefore absolutely necessary that some alternative source of fuel supply should be secured, and the only satisfactory substitute which has been suggested is alcohol."

H. P. Mehlin, representing the piano interests of the country, testified that the present price of grain alcohol was about \$2.50 a gallon, of which \$2.08 was tax, leaving 48 cents for the cost of the alcohol, and wood alcohol cost in the neighborhood of 70 cents a gallon, though a few years ago it cost as low as 50 cents a gallon for 75 per cent. spirit. The highest grade of wood alcohol, called "Columbian spirits," now costs about \$1.35 a gallon.

The lighting value of grain alcohol was discussed by R. F. Herrick, representing the American Chemical Society. He exhibited a French lamp fitted with a Wellsbach mantle using gasified spirits. Tests made with the lamp demonstrated that one gallon of alcohol burned fifty-eight hours and fifty-two minutes, the candlepower of

the lamp being 25, and the candlepower hours, 1,471. In a lamp burning kerosene one gallon lasted eighty-seven hours, the candlepower of the lamp being 9 and the candlepower hours, 783. He quoted Professor Rosseau, of Brussels, who had made photometric tests of both alcohol and kerosene burning lamps, and who reported that for lighting purposes alcohol costing 31 cents a gallon was slightly cheaper than kerosene costing 15 cents.

In reply to a query Mr. Herrick said the boiling point of highly purified wood alcohol was about 64 degrees Centigrade, and of grain alcohol about 78 degrees Centigrade. Crude wood alcohol could be bought "around 35 to 40 cents a gallon."

Professor C. E. Monroe told the committee that the production of wood alcohol in the United States in 1904 was 12,493,212 gallons, of a total value of \$5,624,486.

There was some discussion about the possibility of illicit recovery of alcohol from untaxed denaturized alcohol in case the bill should become law. A statement was presented to the committee which had been made by Professors Remsen, Chandler and Parker, all eminent chemists, which says: "It is plain, from the foregoing, that, considering our experiments as final—that is, experiments on this very point—it is impossible to purify the mixture containing wood naphtha to a sufficient extent to make it palatable, without distillation, and hence apparently it would be as difficult to carry on the process of purification on a large scale as to carry on the illegitimate manufacture of alcohol."

An interesting colloquy ensued regarding the ease with which the illicit distillation of alcohol could be carried on:

"Mr. Clark: I will tell you how simple the making of alcohol originally is. A convict in the Missouri Penitentiary took an old musket barrel that was used as a poker and made a worm out of it, and saved up the pieces of corn bread he had in the jail and made a mash out of that, and he made alcohol and made his own tippie, and he got so drunk that he attracted the attention of the officers in the jail."

"Mr. Kline: That only proves that the most expert men in Missouri are evidently in the penitentiary."

"Mr. Clark: No; but it shows how simple the act of making alcohol is if it was not for the revenue officers going around after them."

James S. Capen, representing the Detroit Board of Commerce, was heard as to the probable demand for denaturized alcohol, especially for use as a fuel in internal-combustion motors. In the course of his remarks he said:

"As a power producer alcohol is about equal to gasoline. It is true that at present there is a little more difficulty in starting an engine with alcohol than with gasoline, but this will be soon overcome once you give to engine builders an incentive to overcome it; in fact, even now I think I can

take you to a place where you can see a carbureter that will work with alcohol as well as those now in use work with gasoline.

"There is far more safety in the use of alcohol than in the use of gasoline, and the fact that a fire produced by alcohol is readily put out by water makes it especially attractive, as water only spreads and increases the danger from a gasoline fire. Then, too, with alcohol there is no use for a law that it cannot be drawn after dark by candle or lamp light.

"Cleanliness is another attractive feature in the use of alcohol. Cylinders and valves do not get clogged by the left-over products of combustion. Odors arising from it are scarcely perceptible and not unpleasant. There will be no need to have one boy play he was the gasoline smell, when our children are playing they are automobiles. In fact, the disagreeable features of gasoline are almost entirely absent from alcohol.

"To sum up, the reasons that alcohol is preferable to gasoline for power use are:

"First: It can be produced as cheaply, perhaps for less, within a short time.

"Second: There never will be any chance to advance its price on account of scarcity.

"Third: It is so much safer that one can almost say it is absolutely safe.

"Fourth: It is absolutely clean and sanitary.

"Fifth: If there is a leaky pipe in the bottom of your boat it can be so arranged that the alcohol can be made to mingle with the water, so that danger from fire or explosion is absolutely prevented."

Alcohol was largely used for lighting, cooking, fuel and industrial purposes in the United States previous to the imposition of the prohibitive revenue tax. In 1864 Cincinnati alone utilized 12,000 bushels of corn a day for distillation. The production was enormous; with less than half the present population the annual production was 90,000,000 gallons, indicating that with the increased uses to which it is now put where untaxed, the agricultural interests would profit vastly from the greatly increased market for cereals, mainly corn. Alcohol is sold in South American countries and in Cuba at about 10 cents a gallon.

Its employment in automobiles, while it would doubtless necessitate radical modifications in present motor designs, especially in the carbureter, would be certain to appeal to the self-interest of the farmer, who would see in every passing machine a possible customer for farm products.

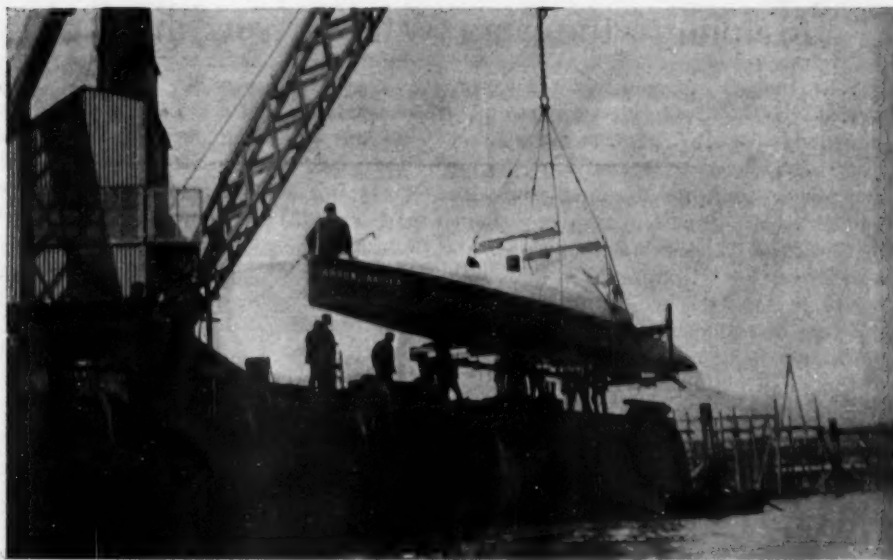
On June 13 begin the Scottish Reliability Trials, extending over four days. The first day's drive is from Glasgow to Edinburgh; second day, Edinburgh to Aberdeen; third day, Aberdeen-Pitlochry, and fourth day, Pitlochry to Glasgow. The whole distance is 673 miles. The cars are divided into classes according to their price, while a special section is reserved for steam cars.

Yarrow-Napier for Monaco.

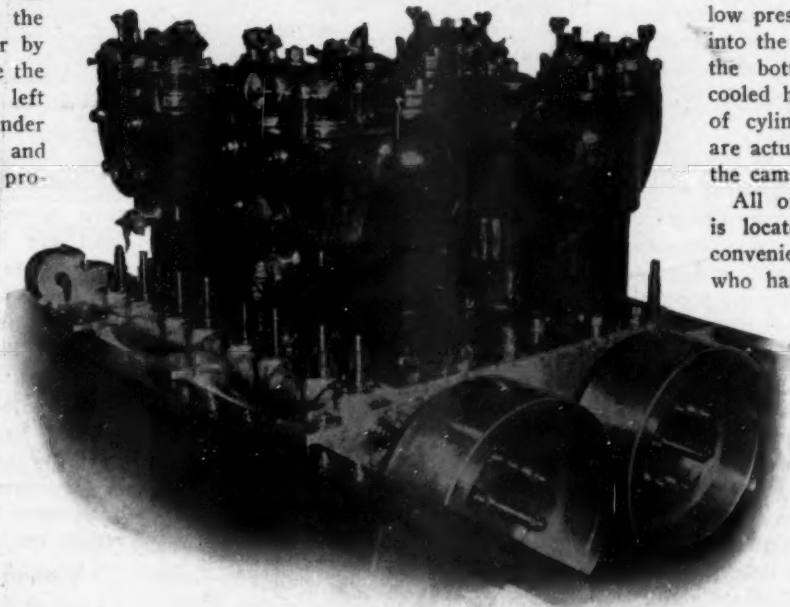
An interesting English contribution to the forthcoming auto-boat races at Monaco is the new Yarrow-Napier, which is shown in the accompanying photographs. This new craft replaces the *Napier II*. Yarrow is one of the world's most famous torpedo-boat builders, and there is a suggestion of the fighting craft in the above-water appearance of the new racer. A long, sharply-pointed turtleback extends from the bow to aft of the midship frame, and from this protrudes a tall stack, up which the exhaust from the gasoline motors can be directed.

The *Yarrow-Napier* is fitted with twin screws driven by independent motors, and the hull is built on the Saunders system, resulting in a considerable saving of weight over the steel hull construction. The motors are of the regular four-cylinder type, each of 75 horsepower. One is fitted with a reversing gear and the other with a clutch in the line shaft. In starting up, the motor with the reversing gear is turned over by hand, in the usual way, while the clutch of the dead motor is left open. When the boat is under way the clutch is let in and the rotation of the idle propeller turns over the dead motor, which starts under its own power when the switch is closed.

The exhaust sides of the motor are inboard and opposite, the gases passing into a common receiver which is piped in the motor water-cooling system. The hot gases are thus considerably lowered in temperature and can be directed through a muffler to the stack from which they pass at a comparatively



"LAUNCHING" THE "YARROW-NAPIER" WITH A DERRICK.



TWIN FOUR-CYLINDER ITALIA MOTORS BUILT FOR AUTO BOAT "CAFLIT."

low pressure, or they can be turned into the sea by a connection through the bottom of the boat. Water-cooled heads are fitted to each pair of cylinders, the valves for which are actuated by rods and tappets off the camshaft.

All of the controlling mechanism is located abaft the engines, in a convenient position for the engineer who has in sight tachometers connected to the motors so that he can see at a glance whether or not they are turning at the same speed. The steersman's seat is located on a gasoline tank in on the afterdeck. The boat has been shipped to Monaco.

TWIN MOTORS OF THE "CAFLIT."

An interesting and novel marine motor was recently placed on exhibition in the salesrooms of Henri Fournier, in Paris. This is the double motor built by the manufacturers of the Italian "Itala" car for the auto-boat *Caflit*. The motor is practically two four-cylinder motors secured to a common bed-plate with shafts parallel; the cylinders have a bore of 7 inches and a stroke of 5.9 inches. Each group of four cylinders is independent of the other and has its own carbureter, magneto, water pump and oil pump. The *Caflit* will be entered in the races for which she is eligible at the Monaco meeting.

POSSIBLE MONACO WINNERS.

In the Monaco motor boat races which start on April 8 and continue during the week, the racing boat *Antoinette V.* is one of the competitors. The hull was built last year by MM. Pitre et Querner to accommodate a 250-horsepower Hotchkiss engine, but is now to be fitted with four eight-cylinder Levavasseur motors.



"YARROW-NAPIER" TWIN-SCREW AUTO-BOAT UNDER SPEED, SHOWING WAKE.

Helpful to the Man Who Drives His Car.

With the increasing use of the cardan shaft drive a wider dissemination of knowledge of the application of foot brakes becomes a necessity to drivers and owners, who for the most part have gained their experience from chain-driven cars. The injudicious use of a foot brake that is connected to a propelling shaft, or to the projecting shaft from the gear box, is disastrous, and destroys more quickly than anything else, the life of the small pinion. Even noted drivers sometimes severely use the foot brake without considering the effect of the wear and tear on the rear axle, whereas if side brakes are used when declutching, the strain is distributed only on the road wheels. Generally speaking the purchase of a hand brake is a third greater than the foot brake, and when the latter is used it is the means of causing back lash and a great strain on the differential and the small bevel pinion, which is generally keyed onto the cone of the propelling shaft.

What to Do if the Brake Breaks.

J. D. Maxwell, the constructor of the Maxwell cars, says, that many drivers of automobiles have unnecessary fears for the breaking of brake bands, and other braking gear. In explaining his proposition, Mr. Maxwell says that if the driver will only keep his head, there is no reason why there should be any great amount of danger or damage. "If there is a giving away of the brakes," says Mr. Maxwell, "the best way to stop a car going at full speed is to first withdraw the clutch. The next thing to be done is to change the transmission to the second speed, and following this, the electricity should be switched off. Then, as the fourth step in the process, if the operator will throw in the clutch very slowly and carefully, he will find that the car will gently and almost imperceptibly come to a standstill. It is not best to throw into the low speed because this gives a sudden shock to the machinery and is apt to send some of the passengers against the seat ahead or over the dashboard. It is much better to use the second speed, throwing the clutch in very slowly. The effect is to shut off the shaft and engine which are turning over purely by the force of inertia, and in this case the clutch acts as a brake."

Skidding on Wet and Dry Roads.

Some cars show a tendency to side skid more than others, a fact that is almost invariably traceable to the efficiency of the brakes, the application of which tends to prevent the wheels from rotating, and if both wheels are locked, whether the roads be dry or wet, the

car is certain to skid. Many drivers deny the fact of there being such things as dry skids, but they are real experiences and are most often noticed when a car is traveling fast and hand brakes are applied in conjunction with the foot brake with sufficient force to securely hold the wheels. At such a time a perceptible movement to the side of the rear portion of the car is noticed. The best remedy is to apply the brakes with judgment and care.

One Cause of Motor Overheating.

Engines sometimes are disposed to develop a tendency to overheat after they have run previously without an indication of such peculiarity. One cause of such heating, it has been demonstrated, is due to the fact that after a time, more particularly on live axle cars fitted with internal expanding brakes, a certain amount of wear takes place on the bearings of the rear wheel, and this allows the wheel to be forced upward relative to the axle sleeve, and since the brake-segments are carried on a bracket secured to the sleeve it follows that the lower portion of the brake segment is lower relatively to the brake drum. The effect is that it rubs, and in consequence the engine must work as though it was always driving a car up an incline.

Starting Single-cylinder Motors.

Trouble is frequently experienced in starting single cylinder engines, owing to the fact that the engine is cold or the mixture is being imperfectly formed for ignition. A few seconds' time should be allowed for the carbureter to do its work of mixing properly, and then the charge should be given a chance to reach the compression chamber of the motor. Depressing the inlet valve and giving the motor a few brisk turns will work wonders with the most refractory machine. Then when the switch is thrown on and the crank given a quick turn to bring the piston over the compression point, it will be found that starting is quite an easy matter. Of course the throttle valve must be opened before the inlet valve is depressed.

Important for Amateur Tire Repairers.

When both outer cover and inner tube have been punctured it is best, in making temporary repairs on the road, to scrape the rubber around the puncture until it is quite rough with either a file or piece of emery paper. This gives the solution a surface to hold to, and unless this surface is thoroughly roughened the patch will not adhere. The solution should be allowed to reach the stage of consistency called "tacky" after it is spread on the tire and the patch before the latter is placed on the hole. Press the patch on

firmly and evenly and allow to set, after which cover with French chalk to keep it from adhering to the cover. Large holes can be temporarily repaired with plasters of several thicknesses of canvas vulcanized together, but their use can never make the repair a permanent one.

Loose Bolts and Pounding.

Among the frequently overlooked causes for an engine pounding may be included the loose engine or cylinder bolt. At each ignition the piston is forced down and the crank is forced around in one direction, while there is a tendency for the cylinder to be forced up and round in an opposite direction. At each ignition, if the bolts holding the cylinder down are loose, there will be a metallic knock difficult to locate, but very easily remedied when discovered. A loose key in the flywheel is another fruitful source of motor pounding, to which must also be added pre-ignition due to any cause, and worn bearings.

Variations in Power and Cause.

With good compression and satisfactory ignition motors will pull up to their form provided the carbureter is right. At times when running light a motor will turn splendidly, and engage it to the load and it fails to respond. It is a pretty sure guess that the carbureter is at fault when the above symptoms develop. The reason the motor may run well without a load is due to the fact that when there is no load it has nothing to overcome except its own weight and friction, so that a very small supply of explosive mixture will keep it running. A gasoline motor is something like a man—both must be well fed to get the best results out of them.

Varnish Finishes Should Be Dry.

Lasting beauty in a car largely depends upon the manner in which the varnish finishes have been treated. To test the varnish as to its dryness on a newly delivered car or one that has been done over, press the ball of the thumb against some unexposed portion of the body for several seconds until the heat of the blood is transferred to the varnish. If the thumb when removed shows no symptom of stickiness the finish is dry and ready for use; if the contrary, several days more should be given the car to dry. Many an automobile's exterior finish has been ruined by its premature use.

Preserving the Mats.

An excellent method of preserving the rubber mats in the floors of cars is to treat them with a coat of lead-colored paint, after which they should be varnished. If the work is properly done, this treatment not only prevents the attacks on the rubber by the oil, but gives an air of neatness to the furnishings.

In the Santa Cruz Mountains.

By W. M. GARDINER

"ARE you going on the run to Santa Cruz?"

It was the man who sold me one of the best automobiles I ever ran who accosted me. I gave a mournful reply in the nega-

corner out of sight; not exactly that he feared it would shy at the train, but that he felt more competent to operate it on a less crowded street.

Determined to fill my rôle properly, I

take notice. He found that to crack the throttle open just a trifle more meant a great increase in speed; that for level, fast running one water pump threw all the water necessary, and the other should be cut out; that the running was much more economical and even more speedy with the engine hooked well down toward center, and that, after all, there wasn't much to do except to watch the road and let the machine go. He soon began approximating the speed in miles per hour, and when an ambitious machine of a rival make came up behind us he opened the throttle so precipitately and gamely that I began to wish he were learning a little less hurriedly, as the car shot bounding forward guided only by his unaccustomed hands. I was relieved when the speedy little vagrant behind us quit and we slowed down.

A little later I discovered that the seller of the car had neglected to provide a state number for it. The California statute provides that for five days, while his own number is being procured, a purchaser may use a duplicate of the seller's number. At Warm Springs we disembarked to see what we could do for a number. An obliging dispenser of fluids provided us with a large piece of wrapping paper, a marking pot, and in a short time we had extemporized a huge "6 CAL.," which was wrapped around the open tonneau door and securely held in place when the door was closed.

It was here we saw the remains, in the shape of some broken spokes, of what might have been a serious accident. A machine had come rapidly along a side road which entered another at right angles and there ended. A cloud of dust obscured the fact that the road ended there, and the car was right upon the turn before the operator knew it. He swerved as best he could, but the car skidded badly until a rear wheel gave way under the impossible strain, and the car upset right at the edge of a ditch.

tive, explaining that my machine was getting a much-needed coat of paint.

"Then," explained my man, "you are just the genius I want. I sold a machine yesterday, and the purchaser is determined to take the run and wants someone to go with him. Go right along, like a good fellow, and I won't forget the accommodation. Mind, however, you don't let him know you are a mere owner; he is great on 'experts,' and if he doesn't think you are one of our own men, he will have it in for me. He really expects me to go with him."

I laughingly consented to play mechanic, chauffeur, expert, or whatever was demanded of me during the run; I even agreed to wear pinned conspicuously on my person the large, oval, metal badge the California legislature has seen fit to require to be worn by everyone who operates a machine "as mechanic, employee, or for hire." It was explained that I should meet my man the next morning in Oakland, across the bay from San Francisco.

I showed up the next morning at the appointed time and place, looking for a car painted blue. My man showed up alone, looking for the agent who sold him the machine. Neither found what he was after. There was no blue car in sight for me, and no salesman for him. Finally along came another machine of the same make with one of the garage men aboard. He greeted an unassuming man standing alongside of me, who proved to be just the man I was looking for. Mutual explanations followed, and I found that the whole difficulty was that the man had left his car around the

turned the machine over to its owner as soon as we got out of Oakland, to give him all the experience possible, and right now, for my own satisfaction, I want to say that when we parted company the next day he was running his car like a veteran and has never, I am informed, had any further instruction nor any trouble.

At Fruitvale we struck the County road, which is the pride of Alameda county and much to the credit of its supervisors. Straight and smooth, mile after mile it stretches. My amateur began to sit up and



IN THE HEART OF THE REDWOODS NEAR THE HOTEL DE REDWOOD.



A STOP AT WARM SPRINGS ON THE CALIFORNIA CLUB RUN TO SANTA CRUZ.

Strange to say, the damage to the wheel was the only harm done. A new wheel was telephoned for and all that remained for us to view was a few broken spokes and some badly torn up ground. But it was a good lesson for my pupil.

The run into San José was completed in short order, and then we had lunch at the automobilists' headquarters, the Hotel Vendome. At Los Gatos we struck the foothills. The road ran beautifully along the Los Gatos creek for several miles, but when we got to Alma we found ourselves in the heart of the Santa Cruz Mountains, and the climbing commenced. We overtook an underpowered car laboring along on its low gear, and it kept us back considerably, as well as covered us with dust. Finally, however, the road widened, and we got by.

The road grew more and more beautiful. Graded out of the mountain, it ran along the side of a canyon practically all the way, a cliff on one side and a precipice on the other. There was constant swerving, turning and twisting; it was impossible to see around the turns, and horn as well as steering gear were constantly in use. The roadbed was fine, however, and we stole swiftly up, mile after mile, until the summit was reached and the descent began. Then came a strain on the brakes; foot and hand brakes were used in alternation, and frequent stops were made to cool them. Most of the stops were made amid attractive surroundings, so that we could utilize the time for the taking of photographs.

We reached Santa Cruz very comfortably, about seven o'clock in the evening, putting up at the Sea Beach Hotel, which had made extensive preparations for the entertainment of the Automobile Club of California.

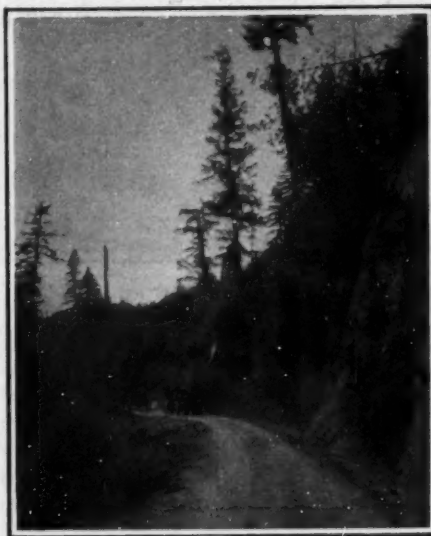
About 10 o'clock the next morning we headed for home. The road up the mountain in the morning sunlight made a beautiful trip. The road follows a deep canyon all the way up—turns and twists are innumerable, but the roadbed is splendid. We were among the first to return, and had the road pretty much to ourselves. We stopped at the Hotel de Redwood—a beautiful little summer resort almost up to the summit, and surrounded with towering redwood trees. The trip down the other side of the mountain was without incident; we kept our horn going all the way, and, on rounding one turn in the road, noticed a horse-drawn vehicle waiting about seventy-five feet ahead of us for us to pass; as the road was wider where we were, I beckoned the driver to come on, which he did, and as he passed us he ejaculated that "four of them things had passed him that morning and that ours was the only one that had any gentlemen in it." We appreciated the compliment, and told him that we tried to behave ourselves, even if we were automobilists.

We took lunch at a little summer resort called "Glendora," where we found everyone eager for a ride. We bundled several into the machine, taking them as far down

as the gate, but one of the girls was not satisfied with this trip and stayed with us until we reached Los Gatos, braving a five-mile walk home through the hot sun after the ride was over; we told her that this was as bad as walking up hill after sliding down.

From San José we took the road up through Centerville and Alvarado. The road lies close to the bay, and in the vicinity of the two towns mentioned the country is quite marshy and there are a number of bridges.

Approaching one of these, we noticed an automobile just pulling off it toward us; next we noticed a girl on the bridge, waving a red hat at us. This looked like a pretty good danger signal, and, thinking that something might be wrong with the bridge, we slowed up. The girl explained



ON THE UP-GRADE FROM SANTA CRUZ.

that the people in the automobile were her friends and had persuaded her to come out part way to San José with them and ride back on the train, but that she seemed to have come too far, and there were no signs of trains, towns or stations, and, noticing that we had some spare room, she thought we might be induced to take her back into town. We signified our acquiescence, and she immediately clamored for a front seat, both of which were occupied. Just where she intended depositing herself she did not announce, but, as I was not running the machine, I concluded it discreet to get out of the way, and betook myself to the tonneau and a cigar. The young woman settled herself comfortably and began a cheerful conversation with the operator, while I devoted myself to my cigar and the study of back hair, of a blonde hue which seemed to be home made. After some distance I was permitted to get into the conversation occasionally, but my services as instructor in the operation of the carriage had by this time been completed and I did not seem a necessity in any other particular. I was finally deposited at my own door, and left

the car with the remark that I was pleased to remove the only drawback to the complete enjoyment of the other occupants.

The trip was really a severe and exacting one, being a long one and the roads steep. Nearly every machine had to go a great deal of the distance on the low gear, yet I heard of only two cases of stripped gears, and one delay by a magneto out of commission. I saw no tire troubles and had none myself. This certainly speaks well for the serviceability of automobiles, and of the better work which is being done by tire-makers. The other day I saw a tire off, of which every bit of the rubber on the tread had been worn, and yet the fabric was perfectly good and the tire ready for a new tread.

Such a trip as this one of the A. C. C. also brings out good fellowship and a better feeling among automobilists; then, too, on a club run unusual care is customarily taken to favor horse-drawn vehicles and ordinarily results in a better attitude toward automobiles. The club run is bound to grow in favor and will always be a benefit to the sport.

Novel Uses for Autos.

Among recent reports of utilitarian purposes to which the automobile has been put is one from Waukegan, Ill., where Richard Morrow, president of the local automobile club, attached a snowplow to his car and drove up and down his walks and drives, while his neighbors perspired with shovels.

It will be remembered that last fall a Maxwell car was used to haul a road roller over the roads in Tarrytown, N. Y., at a time when it was difficult to secure horses for the purpose.

Two farmers living near Ashtabula, Ohio, used an automobile last summer to pull a mowing machine, and another farmer near Canton, Ohio, for months saved time and money by towing loads of hay and grain to market behind an automobile. Being anxious to grind some feed one day, but unable to get power from his windmill, he ran his car into the barn, jacked up the rear wheels, passed a belt from the grinder over one of the tires, and completed the job in a hurry.

Thomas Higginbotham, of Chicago, utilized power from his auto during the past winter to sharpen skates. Printing presses have been run in an emergency with automobiles in the Northwest, electric current has been generated by automobiles for searchlights in South Africa, and autos have been rigged for hoisting heavy articles by block and tackle.

To stop a grass fire in his field a farmer near Conneaut, Ohio, last fall hitched a plow to his car and quickly ran a few furrows around the danger zone.

Germany, Austria, France, and England will take part in the international motor cycling race in Bohemia next June.

Factors Contributing to Comfort in Autos.

Influence of the Engine, Diameter and Nature of Wheels and Tires, and Body Suspension.

Translated from the French of H. André in La France Automobile.

THE use of the internal combustion or explosion engine as a prime mover in automobiles, especially in touring cars, has led manufacturers of chassis and carriage body builders to come to an understanding, so as to insure the greatest possible degree of comfort in an automobile when traveling on the road.

It should be borne in mind that comfort in an automobile depends not only upon the greater or less amount of room allowed the passengers occupying the seats, upon the luxuriousness of the cushions and upholstery, the equipment, and style of the body, whether closed or open, but also and more particularly upon the stability and speed of the car, the balance of the motor, the nature and construction of the frame, the wheels, provisions for absorbing the shocks and vibrations sustained by the different parts, and upon the smooth operation of the machinery.

It is of interest, therefore, to every user of automobiles, whether for professional or touring purposes, to realize the influence of these factors upon comfort. It is the purpose of this article to discuss these factors and to investigate the means adopted for preventing as much as possible the weariness and muscular strains usually to be felt after a journey of considerable length. It goes without saying that on ordinary short runs the importance of comfort is not fully realized, since one has not sufficient time to appreciate it. As a rule it is only after having spent four or five hours or more in a car that the strain is felt.

INFLUENCE OF THE MOTOR.

The influence of the motor is considerable. With gasoline motors the lack of flexibility in the power developed, the shocks produced by the exploding mixture, the disagreeable odor of the exhaust gas, the noise, the inflammability of the fuel—all of these features, each more or less objectionable and destructive of comfort and pleasure, had to be obviated or nullified.

Almost perfect balance of the engine has been obtained during the last few years by the general use of four-cylinder motors which, because of the number of explosions to the revolutions and because of their construction, operate more regularly and smoothly. It can, in fact, be observed that almost every touring car is now fitted with a four-cylinder engine which is more powerful, smoother running and more flexible than an engine of one or two cylinders. Many manufacturers have long recognized this, and in the last few years we have seen new companies start in business with four-cylinder cars whose maxi-

mum power was 15 horsepower (C. G. V., Hotchkiss, Berliet, Delaunay-Belleville, etc.).

DIMINUTION OF NOISE.

The noise of the motor has also been diminished to a considerable extent, the new engines being practically silent as compared with those made four or five years ago. Many factors contribute to the reduction of noise.

First, perfect adjustment of the different parts, allowing no loosening.

Second, mechanical operation of the valves.

Third, cases inclosing in an oil bath all working parts, such as the gears and cams.

Fourth, the use of fiber or rawhide gears and gears with helical teeth.

Fifth, carbureters rationally made and designed with regard to apertures and auxiliary air valves.

Sixth, mufflers or silencers that must (a) weaken or absorb as completely as possible the noise of the exhaust, creating at the same time as little back pressure as possible; (b) be light, not too large, and simple in construction.

An explosion engine possessing all of the foregoing features will produce hardly any more noise than an electric motor.

ADVANTAGES OF WOOD WHEELS.

An automobile undergoes zigzag, pitching and rolling movements and shocks and vibrations of all kinds that are not due to the direct action of its engine, but to the unevenness and deflections of the road. Wood wheels, although not so light as wheels made entirely of metal (wire spoke wheels), offer a slight advantage both as driving and guiding wheels. This is due to the fact first, that the sprocket wheel (in case of transmission by side chains) is bolted to the middle of the spokes, which, being of wood, and slightly flexible, act as a buffer between the motor and the felly, to the benefit of the hub and the transmission; second, that the use of different materials on the same wheel (wood, and steel or bronze for the hub) offers the great advantage of preventing vibrations.

Wood wheels sometimes loosen a little in the course of time, but this can be corrected by shortening or tightening up the felly. Flexibility is a very important quality in a wheel, as the wheel is continually subjected to powerful shocks received from the ground or through the axle, due either to speed, inertia, or the direct action of the engine. When distributed over one or several flexible parts, the destructive power of these shocks is diminished to a considerable extent. On the other hand, in the case of

the wheel made entirely of metal and inflexible, it can be observed that the hub has a tendency to expand as a result of these shocks, producing a looseness that should not exist there, even when ball bearings are used.

From the foregoing it can be seen that rigid wheels are not best suited to vehicles intended to be run at high speeds and are detrimental to comfort. In any case no wheels should be used unless fitted with pneumatic tires; with steel wheels this condition is indispensable.

SPRING WHEELS FOUND WANTING.

Is it necessary to add that elastic wheels, even those which were so much talked of last year, cannot be used on vehicles in which the greatest possible comfort is a requirement, for instance, on cars built especially for touring purposes? This is readily understood, because the absorption of the shocks is, as a matter of fact, effected only through the springs, but not completely. They are first transmitted to the springs of the wheel, thence to the axle (diminished, of course) and from there to the suspension of the car. But they are not immediately absorbed by the compressed air as is the case when pneumatic tires are employed.

All of the joints in an elastic wheel (and there are quite a number) have a tendency to loosen on account of friction, dust and vibration. The axles are likely to bend if not properly hardened and the springs to get out of shape unless they are of uniform thickness and strength throughout their length, so that after having been on the road for a certain time the wheel is no longer well centered or true. Speed tests made with cars supported on spring wheels have given but poor results. Allowing for the necessary coefficient of safety, it was barely possible to cover seventy to eighty kilometers (37 1/4 to 43 miles) an hour, and even at that speed the wheels showed rather poorly, especially when the road surface was a little rocky, requiring more driving effort than wheels fitted with pneumatic tires. The loss of power and the reaction of the springs in the wheels could easily be felt. Even without taking into consideration the serious inconvenience which might arise from broken axles or springs, suspended limbs, as they are sometimes called, must be left out of consideration when great comfort as well as speed are desired.

"DISHING" AND CONGRUOUS APPEARANCE.

Furthermore, the dishing which insures greater flexibility and resistance to lateral stresses is possible only with wood wheels. It has been proved that two flat wheels offer less resistance than one which is properly dished and which works in a direction favorable to its resisting strength, since the former, having no strength against side strains, are liable to give way. So far as appearance, which must also be taken into consideration, is concerned, the wood wheel

is generally preferred, and whatever may be said to the contrary, this is not merely a question of habit or of training of the eye; in fact, whereas it is perfectly natural for a bicycle, a motorcycle, or even a light carriage to be borne high above the ground on slender wheels, it is unsightly to have any heavy vehicle, such as most of the automobiles commonly used, rest upon frail looking supports whose appearance does not correspond with the work required of them.

It seems, therefore, that even from an artistic standpoint the wooden wheel is better suited to an automobile than the steel wire wheel, which is made more incongruous and unsightly by its large rim to receive the pneumatic tire.

LARGE WHEELS PREFERABLE.

There now remains for consideration the diameter of the wheels and the body suspension, both of which have something to do with comfort. In mechanics it is given as a principle that the larger the wheel is the more easily it will run and the better balanced it will be, which principle is undoubtedly correct, as a rule, of course, for average dimensions. The question is

COMPARISON OF WEAR ON TIRES.

It might be said that the springs are on the car to absorb such shocks, which is true, but the springs produce a reaction proportionate to the shocks received by the wheels and which must be as slight as possible if it is desired to avoid fatigue on a long run. Moreover, the wear on the tires must be reckoned with. It is understood, for instance, that if a runabout is fitted with 70-centimeter wheels (28-inch) and is driven at a speed of thirty kilometers (18 2-3 miles) an hour, or 500 meters a minute, as the distance traversed at every turn of the wheels is 2.19 meters each part of the circumference will come into contact with the ground 500 divided by 2.19, or 228 times a minute, or 13,680 times an hour.

With an 80-centimeter wheel (31 1-5 inch) each part of the circumference will come into contact with the ground 199 times a minute or 11,949 times an hour. The difference is therefore 1,740 times an hour. It must be borne in mind, and it is a fact, that the tire of the 70-centimeter wheel will wear faster on the same run than the tire on a wheel of 80 centimeters

gravity too high unless the axles were dropped to a considerable extent, and on account of their large diameter they would have to be mounted more firmly.

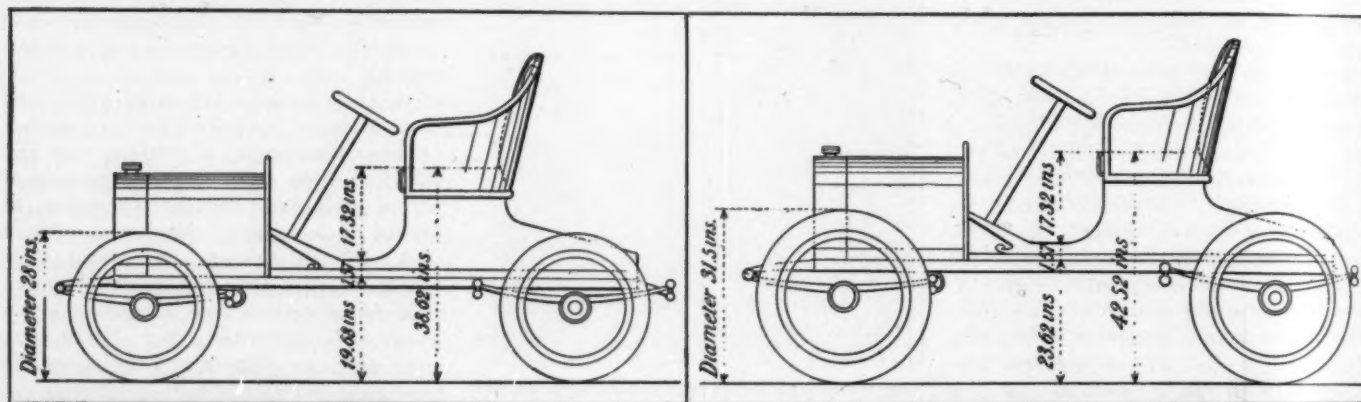
The average recommended for the diameter is therefore easily understood. The advisability of having four wheels of the same diameter is also evident on account of the facility afforded when it comes to changing wheels or repairing tires.

IMPORTANCE OF THE TIRES.

The most important part of the wheel, so far as comfort is concerned, is undoubtedly the tire. This is also true in the matter of speed, as without the air cushions it would have been impossible to attain the great speed developed in the last year or two.

Although elastic tires have been in use only a comparatively short time, they were invented long ago. As early as 1840, when vulcanization was first attempted, trials were made with solid rubber tires. The modern tire, which is an improvement upon Thompson's pneumatic wheels, is to-day employed everywhere for bicycles, motorcycles and automobiles.

The carriage box, or car body, is sus-



FIGS. 1 and 2.—RUNABOUTS FITTED WITH 28-INCH WHEELS AND WITH 31.5-INCH WHEELS, ILLUSTRATING INCREASED HEIGHT AND CLEARANCE.

whether or not this principle of the advantage of large diameter, which has been tested by General Morbin, is of practical interest when pneumatic tires are used, and whether it has any influence on comfort in an automobile. We believe it has, because wheels of small diameter, even if fitted with pneumatic tires, permit shocks to be felt much more and consequently diminish the comfort of the passengers. This can be readily understood, since the smaller a wheel is the deeper it settles into the holes, ruts and inequalities of the road, wasting more motive power and incurring heavier shocks, while the reaction of the springs is increased accordingly. This can be best realized on highroads or pavements where the paving stones are not on the same level—and there are many such roads left, in spite of the influence of the new form of locomotion and its devotees. On such a pavement it is not possible to exceed a certain speed on account of the intensity of the shocks produced, which are found to be all the more violent as the diameter of the wheel is smaller.

Moreover, the 70-centimeter wheels, which are too small in diameter even for runabouts, are not only detrimental to comfort, but bring the frame of the car too near the ground. For instance, it can be seen from Figs. 1 and 2 herewith that a runabout mounted on 70-centimeter wheels, if rationally constructed, has its frame 50 centimeters (19.68 inches) above the ground, which mars the general appearance and compels the passengers to be seated too close to the ground, where they get a great deal more dust and are much less comfortable than if they were sitting at a reasonable height.

In the opinion of the writer, no wheels should be less than 75 centimeters in diameter, even for runabouts. Wheels of 80, 83 and 85 centimeters (31.5, 32.68 and 33.46 inches) are suited to light vehicles, whereas 87, 90 or 95-centimeter wheels (34.55, 35.43 and 37.36 inches) are most desirable for cars with powerful motors.

So far as yet larger wheels are concerned, they would raise the center of

pendence by the springs, but in addition to these the whole car and the axle-trees especially, should be given a good suspension, hence the use of elastic tires. The resiliency of the tires is not of the same order as that afforded by the springs; all small shocks are immediately absorbed by the former. A spring is easily bent as much as 10 centimeters, whereas the tire is depressed only about 3 centimeters.

The frame being protected against the constant trepidations of the road, the chances of any working parts being broken or put out of order are diminished, and the breakdowns consequently less frequent, which is a capital point.

Not only do tires add to comfort in a car, but they furthermore facilitate traction, indirectly, of course. It is therefore essential to have tires with air cushions proportionate to the weight of the vehicle; that is, not too small; the larger they are the greater will be the comfort afforded. Tires of 90 millimeters and 120 millimeters are quite satisfactory even for light cars.

FRAME AND MOTOR SUSPENSION.

It must first be admitted as an absolute principle that both frame and motor have to be suspended. Some manufacturers suspend only the frame, and place the motor on string pieces connecting the axles. A very flexible suspension of the whole vehicle is demanded because of the greater traction thereby afforded, which is of great importance.

Only plate springs can insure the desired easy suspension of the cars. They serve a double purpose: viz., to support a determined weight, and at the same time to weaken the shocks sustained by the vehicle when in motion. Every spring must fill two conditions:

1. Absolute resistance; that is, power to support the greatest flexions and heaviest weights without any permanent deformation.
2. Suppleness, or flexion under different weights and different shocks. A spring undergoes constant series of oscillations; the larger they are under a given shock, the more supple the spring is.

The springs react upon the car with a strength corresponding to that received through the axle-trees, and effect a certain acceleration which is the shock perceived by the passengers. This acceleration for a given force is in inverse ratio to the weight of the car, and will, therefore be all the lighter as the car is more heavily loaded. This can, in fact, be noticed in cars of average weight which are much more comfortable than light runabouts. (This is evident also when the car is fitted with the Truffault shock absorbers, also called Truffault suspension. Most of our readers are familiar with this device, applied to many automobiles.)

FORMS OF SPRINGS.

Straight or half-elliptic springs are generally used; they are connected with the frame by hooks and links, but the latter must be given a reasonable length and some inclination, so as to let the spring run according to the lengthening or shortening of the chain.

A former engineer of the Western Railroad of France (Chemins de Fer de l'Ouest), in a report on the importance of suspension for railroad cars, which was submitted to the Société des Ingenieurs Civils in June, 1888, demonstrated by figures and also by the use of an experimental device (Fig. 3), that by simply having the spring hangers inclined in a different way (all other conditions being unaltered) the

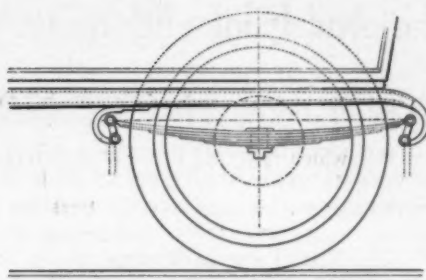


FIG. 4.—FERAUD SPRING SUSPENSION.

flexibility of a spring is considerably increased, in certain cases even as much as 100 per cent.

With this device he obtained curves showing that:

1. The main leaf of the spring does not bend any more than the others, and the leaves have therefore no tendency to separate.
2. After each oscillation the car is not lowered as much as the loss of height of the spring would indicate.
3. The loss of height under the weight of a car is inferior to that sustained under the same weight under different circumstances.

4. The flexibility utilized is superior to the actual flexibility of the spring itself.

The spring hangers being placed inside, as shown in Fig. 4, the axle-trees can be put somewhat further apart and the springs lengthened, which increases the suppleness of suspension and facilitates traction somewhat.

The French manufacturers who entered cars in the Paris-Vienna race have realized the advantage of a good suspension; it will be remembered how few vehicles finished the race on account of the poor condition of the Austrian roads. A good many cars were compelled to give up the race only because of a too stiff suspension.

USE OF SHOCK ABSORBERS.

Mors & Co. took out a few years ago a patent for suspension with *amortisseurs* (absorbers) in connection with their racing cars. They have kept the usual springs in front and rear, and have added six absorbers, one on each side in front and two on each side at the rear. These operate the same as steam engine regulators or hydrodynamic artillery brakes (dash pots). Their object is to absorb all trepidations and weaken as much as possible the vibrations undergone before the spring resumes its normal position as soon as the shock or obstacle is overcome. The purpose of these

amortisseurs is, therefore, not entirely to suspend the car, but to improve and complete the flexibility of the springs.

The advantage of this improvement is an absorption of the greater part of the trepidations and hence greater comfort for the passengers and a considerable reduction of wear on the tires.

Straight or semi-elliptic springs are the only ones to be recommended. Whatever may be the way they are mounted, they must be long, composed of large leaves of decreasing thickness, so that all leaves, though of different lengths, have the same flexibility.

The springs adopted during the last few years are 1 m. 15 c. (45.27 ins.), 1 m. 20 c. (47.24 ins.) and even 1 m. 25 c. (49.21 ins.) in length, and .045 meters (1.77 ins.), .070 meters (2.75 ins.) and .055 meters (2.165 ins.) in width, according to the weight of the vehicle.

CARRIAGE WORK.

The carriage maker can, to a great extent, contribute to the comfort of an automobile. The car is more or less comfortable according to the form of the body, varying from summer to winter; to the cushions being more or less soft, to the height of the seat backs and the space allowed for the feet.

A practical solution is to have a frame so constructed that the body may be changed at will. In summer one can use an open body with glass in front, and in winter a closed carriage on the order of limousine or coach.

The seats, cushions and backs have considerable importance so far as comfort is concerned. They all must be given a reasonable height. On a car 32 to 33 centimeters above the ground, we would advise cushions 12 to 14 centimeters high, and 60-centimeter backs.

When taking into consideration the short time elapsed since the coming of the automobile, one is amazed at the progress attained within so very few years. The old cars, high on wheels, have been replaced with lower vehicles which are better suspended and more practical. There is still room for improvement, as our life, being more and more active, demands conveying facilities more rapid and at the same time offering all the comfort desirable and absolute safety.

To continue this ascending march of progress in a branch of our activity which is now of everyday application, we must rely on the joint effort of all creative minds and on individual initiative based on common sense, to invent, perfect and improve continually. We must not lose sight of the fact that all progress comes from trying to do better.

The Yacht Club de France is promoting a race for fishing boats fitted with internal-combustion engines, to be held in the St. Malo bay at the end of August.

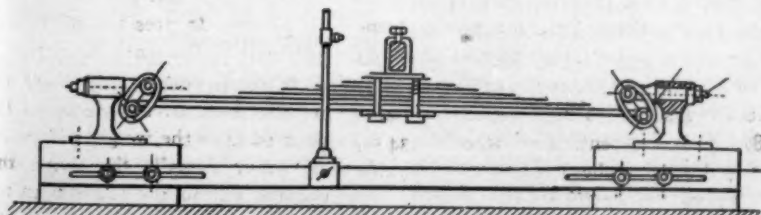


FIG. 3.—FERAUD DEVICE FOR TESTING DIFFERENT SPRING ARRANGEMENTS.

The Doings of the Air Pilots.

Count Henri de la Vaulx, the eminent Parisian aeronaut, who is vice-president of the Aero Club of France, a member of the Automobile Club of France and holder of the world's record for long-distance ballooning, was tendered a joint reception by the Automobile Club of America and the Aero Club of America, at the clubhouse of the former Tuesday evening, April 3. At the close of the reception the Count related a number of interesting experiences from his voyages above the earth's surface during the past seven years, in which time he has made more than 200 ascensions. Vitagraph pictures and lantern slides supplemented the narrative.

Since the Count's arrival in this country he has made two ascensions, the first at West Point Saturday, March 31, in his balloon, the *Lurion*, in which he experienced some difficulty at the start, owing to the high wind. He descended safely at Peekskill some eight miles distant from the starting place. The second ascension was made on Monday, April 2, in the *Orient* from Port Morris, with M. Charles Levee, and Dr. Julian P. Thomas of the Aero Club of America, as a guest. It was the Count's plan to make a landing at Coney Island, but the wind carried the balloon some miles to the eastward and the landing was made at Middle Village, L. I. During the trip the balloon reached an altitude of 3,500 feet.

The Land Flying Squadron.

With the return of W. K. Vanderbilt, Jr., from the other side this week matters will become active in reference to the Vanderbilt Cup race. Chairman J. D. Thompson, of the A. A. A. Racing Board, has been in conference with Mr. Vanderbilt, and some definite announcements are expected in the near future.

It is probable that Germany will be represented in the Vanderbilt Cup race by five Mercedes of the six-cylinder type and of about 150 horsepower. Foxhall P. Keene, Robert Graves, and John R. Drexel, the latter of Philadelphia, are three of the probable entries, and Mr. Keene will, as in the last race, again drive his own car.

The Frayer-Miller drivers for the American Elimination event of the Vanderbilt Cup race will be Lee Frayer, F. E. Moskovics and William E. Belden, a newcomer to racing, who hails from Pittsburg. The Frayer-Miller car will have a direct drive and a novel rear-axle system.

Henry Fournier's famous Mors car, with which he made the then mile straightaway record on the Coney Island boulevard several years ago, is now owned by James B.

Mrs. Thomas, Augustus Post, and Cortland Bishop followed the course of the balloon after the start in their automobiles and brought the aeronauts back to New York.

Carl Fisher's Airship.

INDIANAPOLIS, IND., April 2.—The airship ordered by Carl Fisher at the New York show has arrived in this city and is now safely anchored in the garage of the Fisher Automobile Company. It is known as the *Comet IV*, and is the first real airship that has ever interrupted the usual peacefulness of Indianapolis. It will be used as both an advertisement and an attraction at county fairs throughout Indiana this summer. Fisher has not yet attempted a flight, and will not do so until an engine is completed for it. Hundreds of people have gone to the garage to feast their eyes on an aerial navigator.

Hamilton's Aeroplane in Florida.

JACKSONVILLE, FLA., April 3.—An aeroplane fitted with an 18-20-horsepower Whitehead motor weighing 110 pounds is to be given a trial during the Atlantic-Pablo Beach Automobile races next week near Jacksonville. Israel Lodlow will make the experiments. The aeroplane will run on six wire bicycle wheels. Charles Hamilton will begin preliminary trials with his aeroplane next week.

Betts, a millionaire brewer of Philadelphia. Between Philadelphia and Atlantic City the old Mors has to its credit one of the fastest runs ever made for this trip.

On Sunday morning, April 1, at sunrise, a private trial was made on the Coney Island and boulevard by the Grout steam racing automobile designed by George C. Cannon, the Harvard student, who has designed and built a number of track record-breaking cars. It is reported that the new machine traveled a quarter of a mile in 10 seconds, and two half-miles in 20 1-5 seconds and 21 3-5 seconds respectively. The car was driven by Harry Maynes and timed by Alexander Schwalbach and T. K. Hastings. The motive power consists of two 36-inch tubular boilers set tandem, tested to 1,400 pounds pressure and has two-cylinder engine of a 4 1-2 bore and 5 1-2 stroke. Single chain drive is used, wheelbase is 112 inches, and the total weight, 2,100 pounds. The machine has been shipped to Florida, where it will make record trials and compete in the races during the Atlantic-Pablo Beach tournament near Jacksonville, April 9-12.

Atlantic City's automobile meet, which

begins on April 25, will have a leading attraction in a three-cornered match race at one mile, which has been arranged between Walter Christie in his 100-horsepower Christie car, T. M. Hilliard in an 80-horsepower Napier and M. Roberts in a six-cylinder Thomas Flyer. In the stock car contests a large list of entries is reported. Distance posts along the beach were placed this week and the course is now open for practice.

Maurice Fabry, of Turin, Italy, accompanied by his 100-horsepower Itala racing car, has arrived in New York, anxious to arrange a match on any suitable course with any machine in this country at the present time. According to Signor Fabry there is likely to be a representation of Itala cars on the Italian team in the Vanderbilt Cup race. He is also arranging to import a number of touring cars of this make during his stay on this side.

HOOSIERS DRIVE THEIR CARS.

INDIANAPOLIS, April 2.—There is not much demand for the professional chauffeur in this city, and the low wages paid here makes a thoroughly competent driver hard to find. Most Indianapolis owners drive their own cars. A very few employ drivers, and their experience has not been such as to cause other owners to emulate their example. Drivers are rarely paid more than \$15 a week, except by the garages, where safe drivers are required to drive cars used in livery service.

A prominent local automobile man says: "The majority of Western owners drive their own cars and thus get the most pleasure from them. There are also fewer accidents, and I believe statistics will show that the majority of accidents have occurred where drivers have had their employer's cars out without the consent of the owner. An owner will drive his car more carefully."

ELECTION OF AUTO BOAT MAKERS.

New officers for 1906 were chosen at the second annual meeting of the executive committee of the National Association of Engine and Boat Manufacturers, held at the Hotel Breslin, New York City, March 26, as follows: President, John J. Amory; first vice-president, H. A. Lozier, Jr.; second vice-president, Charles A. Strelinger; third vice-president, Henry R. Sutphen; treasurer, Albert E. Eldredge; secretary, Hugh S. Gambel. The meeting was preceded by the annual dinner, at which President Amory was presented with a loving cup. The meeting went on record as favoring the proposed national law governing the registration of motor boats engaged in the passenger carrying business.

The "Orphan Day" Idea has caught on in Richmond, Va., where D. W. Vaughan is asking the aid and co-operation of other automobile owners in arranging and carrying out his plan to give the orphans in the different institutions of the city a free ride.

The Weekly Story of Automobile Legislation.

L'Hommedieu Bill the Only Probable Legislation in New York—Looks Like Compromise in Massachusetts.

ALBANY, April 3.—The L'Hommedieu bill will probably be the only survivor of the several measures of an automobile nature now going through the legislative mill. President O. A. Quayle and his fellow directors of the New York State Automobile Association have kept the situation well in hand, and in approving the L'Hommedieu bill, thus carrying out the State Association policy, as expressed a year ago, it is the impression that the automobile leaders have acted wisely.

Last week at the hearing before the Senate Committee on taxation the automobilists spoke for the L'Hommedieu bill after it had been amended so as to make the annual registration fee—not designated as a tax for fear of unconstitutionality—only \$1 for every 500 pounds of weight. Of course this does not include the first registration fee of \$1, which must be paid for all new vehicles as yet unregistered. It is estimated that this "tax" will total about \$90,000, and it will be used in the maintenance of the improved roads of the state. An effort will be made to have the money collected from fines utilized in the same manner. The L'Hommedieu bill also provides that the Secretary of State shall print and distribute the registration list of numbers and owners.

It is understood that the New York State Association, at the hearing on the Stanley bill, postponed from last week until tomorrow, will oppose its passage, though the West End Association of New York City is expected to argue strenuously for it. Though the Stanley bill possesses good points, the automobilists believe in getting along with the present law and the L'Hommedieu bill.

Another Bill with a Commission.

Despite the fact that the commission idea as embraced in the Stanley bill will not be approved by the automobilists, another state commission bill has been introduced by Assemblyman Webber, of Kings. This bill provides for the creation of a state commission of three, appointed by the Governor, who are to have two-year terms, no salary but their expenses, and a secretary at \$1,200 a year. It is further provided that whenever injury or damage to a person or to the property of any person or corporation results from the operation of a motor vehicle on a track or public street or highways it shall be the duty of the peace officers to investigate and send all the information they obtain to this state commission, which shall hear and determine the case. The bill gives the commission power to regulate the traffic of motor vehicles in all the cities and towns of the common-

wealth and make rules and ordinances for its government.

Measures That Are Buried.

Assemblyman A. E. Lee's bill to amend the present motor vehicle law relative to the stopping of motors when a horse or other draft animal is met has been recommended to the Committee on General Laws and is not likely to get out again. If it is again kissed out by its introducer it will be opposed again on the floor of the Assembly, and the chances of its getting through are at present remote.

Senator Grady's bill to make the pedestrian the owner of the highways and byways and to compel all vehicle owners to show cause why they should not be ruled off the track at any and all times does not appear to have more life in it than it did last year, when it made no progress after introduction.

Senator Gardiner's Insurance Idea.

Senator Gardiner has introduced a bill providing that any duly authorized "insurance agent with an office and conducting business in the state of New York" may place automobile insurance covering everywhere in the world, including the state of New York, under a floating form of policy, against the hazards of fire, marine collision and theft in any foreign Lloyds, and such Lloyds shall not be required to obtain any license to do business in the state of New York in order to enable it to assume risks.

Compromise Likely in the Bay State.

BOSTON, MASS., April 3.—From present indications the proposed automobile legislation in Massachusetts this year will result in a compromise. Something more than a dozen bills were presented and were referred to the Committee on Roads and Bridges, which completed a long series of hearings upon them nearly a month ago. Since then the bills have been considered by the committee in executive session, but it was found that so different were the propositions put forward that the committee could not report one bill and leave the others, or report two bills and cover the ground. It was decided, therefore, to put the whole matter in the hands of a subcommittee of five, with power to draft a compromise bill and refer it back to the full committee.

There are various features contained in the different measures, but the points upon which the automobilists and their opponents break are the increased speed limit asked by the automobilists, and the more stringent penalty clause demanded by the antis. The automobilists desire an increase

in the speed limit from 15 to 20 miles in the open country. The antis are opposed to this increase, and want a law which shall decree imprisonment for reckless drivers.

The sub-committee now has under consideration a draft of a compromise bill to which all parties consent, though they do not agree upon all its provisions. In this draft the speed is placed at twenty miles an hour in the country districts, at twelve miles in the thickly settled sections and at eight miles at corners and crossings. By a further provision of this clause it is stated that speed in excess of these mentioned shall constitute a *prima facie* case of infraction of the law, providing the speed is ascertained over a test course at least a quarter mile long.

The bill to prevent reckless driving is included in the compromise in abbreviated form. It proposes, in brief, that for a first or second infraction of the law, which was unconscious, or where extenuating circumstances were shown, the court may place the case on file. A third offence of this character shall of itself revoke the driver's license to operate, and if he is the owner of the car, or, as a dealer or manufacturer, controls the car, his certificate of registration shall be revoked by the Highway Commission for a period of at least fourteen days, and shall be renewed thereafter only at the discretion of the commission. If the court chooses it may apply the existing system of fines, the clause being retained.

For persons who operate with "wanton recklessness and so as to endanger the lives or safety of the public," drastic punishment is proposed. The punishment provided is a fine not exceeding \$100 or imprisonment for not exceeding six months. In addition to this the person convicted loses his license, and if he is an owner of a car or a dealer or manufacturer controlling a car or cars, he loses his certificate of registration. Either license or registration certificate can be renewed for thirty days, at the discretion of the Highway Commission.

Still another provision of the compromise measure proposed is a clause strengthening the law relating to the reporting to the Highway Commission of cases of infractions of the automobile law brought before the courts. Another provision of the compromise is the bill of the Massachusetts State Automobile Association that it be permitted to erect signs along the highways at its own expense.

It is expected that the committee will not report for several weeks yet, for the automobilists desire to give its members a practical demonstration on the roads. It is planned to show the committeemen just how fast an automobile is moving at 4, 8, 10, 12, 15 and 20 miles an hour and also to show how quick a machine can be brought to a stop when moving at different speeds. The automobilists also wish to show the committeemen some of the speed traps in which a large number of machines were held up last summer.

Assemblyman Perkins Drives a Car.

TRENTON, N. J., April 2.—Assemblyman Randolph Perkins, of Jersey City, drives his 70-horsepower machine to Trenton every time the Legislature is in session, and brings with him the greater part of the North Jersey delegation. As Mr. Perkins is the chairman of the committee, to whom the Frelinghuysen Bill was referred for consideration, it is expected that he will do all in his power to render a committee substitute which will be more pleasing to automobilists of New Jersey. Mr. Perkins is a great lover of the sport, and as chairman of the Judiciary Committee, it is expected that he will kill the objectionable features of the bill.

Ohio Enacts Sawicki Bill.

COLUMBUS, O., April 2.—The bill of Representative Sawicki, providing state regulation of automobiles, was passed by the House of Representatives on Friday, but three days from the time of final adjournment, but three members voting against it, and to-day the Senate passed the measure, making it a law. The bill compels owners and operators of all motor vehicles to register with the Secretary of State, and be licensed by that official. It provides a minimum fee of \$5 annually for all automobiles of 30 horsepower or under, with \$3 added for every additional ten horsepower. The fees and fines are paid into the fund of the State Highway Department, and will be used for the improvement of the roads of the commonwealth. Each automobile must have the letters "O. H.," which stand for "Ohio," and the number of the machine; the letters and figures are to be four inches high.

Non-resident owners who have complied with the automobile regulation laws of their respective states are exempt from the provisions of the bill. The Secretary of State is required to furnish the auditor of each county of the state a list of those registered from his county. Manufacturers and dealers are required to register one vehicle of each style or type manufactured or dealt in by him, be entitled to as many duplicate registration seals for each make as he may desire upon payment of a fee of 50 cents for each seal. The House amended the bill so as to make June 1 time for it to go into effect, instead of May 1, as originally provided for. The speed limit is a mile in six minutes in municipalities and a mile in three minutes elsewhere, excepting when approaching a bridge, crossing sharp curve or steep descent, when the rate shall not exceed one mile in fifteen minutes.

Automobiles must be stopped at request or on signal of a person riding, leading or driving a horse or horses on any public highway. In case of an accident the owner of the machine is required to furnish the person injured his name and address. Local authorities may set aside a specific public highway for speed tests or races, to be conducted under proper restrictions for the

safety of the public, in which instance the speed regulation is waived. Municipalities are prohibited from passing ordinances for local regulation of automobiles.

The penalties for violating provisions of this act are a fine of from \$25 to \$100 and imprisonment not to exceed ten days, or both.

[Sims Bill to Die in Committee.

WASHINGTON, D. C., March 31.—The Sims automobile bill which recently passed the House of Representatives, came up before the Senate District Committee yesterday and, judging from developments at the hearing accorded the automobilists, it is likely to die a natural death in the committee. The automobilists were delighted with the treatment accorded them by the members of the committee, and particularly by Senator Gallinger, the chairman, who openly espoused their cause. Arguments against the bill were made by J. M. Stoddard, of the Cook & Stoddard Co., Representatives Gillett and Ames, while Representative Sims, author of the bill, appeared in its behalf. The principal argument was made by Mr. Stoddard, who made a masterly plea against the bill, pointing out that under the restrictions imposed by the proposed law it would be almost impossible to drive an automobile in Washington without constant technical violations of the law.

Figures were presented to the committee taken from the police records for 1905, which showed that during that year there were 1,127 accidents caused by horse-drawn vehicles, trolley cars, etc., resulting in injuries to 503 persons and the death of twenty-two, while during the same period there were ninety-four automobile accidents, injuring twenty people and killing one person. In the latter case, it was explained, the automobilist was promptly exonerated.

Representative Sims endeavored to explain to the committee that he had no personal interest in the bill, but simply introduced it at the solicitation of "hundreds of people." He went into a long diatribe against the automobile, but the committee evinced very little interest in his remarks.

The hearing was brought to a conclusion by Representatives Gillett and Ames, both of Massachusetts, who are enthusiastic automobilists and who told the committee how unjust were many provisions of the Sims bill. Senator Gallinger told Mr. Stoddard to draft a bill along the lines indicated in his argument and he would introduce it in the Senate in lieu of the Sims bill.

Maryland's New Law Pleases Motorists.

BALTIMORE, April 2.—The automobile bill prepared by Osborne Yellott, counsel for the Automobile Club of Maryland, has, after some amendments, passed both branches of the Maryland legislature and is now before Governor Warfield for his signature. It was a stiff fight and some compromises were necessary, but in substance it is identical with the bill described in THE AUTOMOBILE several weeks ago.

In Mr. Yellott's first bill, which aroused the ire of the county and city delegates, the speed rates were increased from six miles an hour in the city and ten in the country to twelve and twenty respectively. In the measure just passed the limit is twelve miles an hour in both city and country. Again, in the first bill non-resident owners registered in their own state were exempt from Maryland licenses, but in the amendment there is no distinction in favor of them. Further, the license fee is raised from \$1 to \$3.

The Boards of County Commissioners—in Baltimore city the police commissioners—are empowered to set aside for a given time a specified public highway or highways for speed tests or contests to be conducted under proper restrictions, but any person driving on a bet or wager, except as provided above, is liable to a fine not exceeding \$100.

It is also provided in the new law that a violator of any section may leave his automobile as security for his appearance, or he may deposit with the officer making the arrest a sum equal to the maximum fine for the offense, after which he may be released till the time set for his court appearance.

It is a misdemeanor for any person to climb upon or in any motor vehicle, whether while the same is in motion or at rest, or hurl stones or other missiles at it or the occupants of it, or who "shall, while such a motor vehicle is at rest and unattended, sound the horn or other signal device or attempt to manipulate any of the levers, the starting crank, brakes or machinery thereof, or set said vehicle in motion or otherwise damage or interfere with the same." The penalty for this is a fine not exceeding \$50, in default of which imprisonment for sixty days may be inflicted.

All persons operating automobiles for hire are required to pay a fee of \$2 for a numbered registration badge, which must be worn conspicuously by the chauffeur. It is a violation of the law for an owner to employ a chauffeur who is not registered.

Under the new law it is also an offense for a chauffeur or "other person having the care of a motor vehicle to receive directly or indirectly any bonus, discount or other consideration on supplies and parts furnished or purchased for such motor vehicle, or on work or labor done by others." It is, further, a violation for a dealer to offer a bonus or discount. The fine for this offense is a sum not exceeding \$100, or imprisonment for sixty days.

All licenses heretofore issued by the Secretary of State remain in full force and are not affected by the new law. The passage of the law is considered more or less as a triumph by automobilists of this city and state, and they are naturally jubilant.

The first church in the country to have a garage for the use of its members is about to be erected in Cincinnati by the First and Second Presbyterian congregations.

GAS TURBINES DISCUSSED BY DUGALD CLERK.

(Continued from Issue of March 29, page 566.)

WHAT is true of a fixed blade is, to some extent, also true of the moving turbine blades. A certain proportion of the energy existing in the gas in the form of motion is inevitably lost whenever this gas comes into contact with any solid surfaces. So much is this the fact that in designing steam turbine blades for any type of turbine, the shape of the blades, the shape or the space between the blades, both moving and fixed blades, or fixed jet and moving blades, is of the first importance; and it has only been found by experiment that certain shapes of blades and passages have a much higher efficiency of conversion than other shapes. In this respect, too, the turbine principle is inferior to the cylinder and piston. In a cylinder, gases expanding behind the piston, the efficiency of expansion may be considered to be 100 per cent., and even an efficiency of compression in many gas engines is also the same order. I do not here refer, of course, to heat losses due to conduction, or anything of that kind, but to efficiency of adiabatic compression or expansion.

Although the efficiency of expansion is relatively low for gases in steam turbines, yet the turbine offers a great advantage in total work obtained from steam. This is due to the fact that the turbine avoids initial condensation; and, further, it permits of the utilization of a very long range of expansion at the low-pressure end, which is not available in the case of steam engines. By saving, therefore, in minimizing initial condensation, and in obtaining added work for pressures wasted in the ordinary steam engine, the Parsons steam turbine more than compensates for any inefficiency of expansion, as compared with the cylinder engine. It is well known, however, in turbines of practically all constructions, including Mr. Parsons', that the efficiency of the steam turbine at the high-pressure end is not so great as that at the low-pressure end. This is partly due to difficulty of adjusting the velocity of blades to suit the necessarily varying velocities at different points of the flow of the steam. This, however, is a small difficulty with the steam turbine, but it is a very great difficulty with the gas turbine. Compared with cylinder expansion, I cannot see how it is possible with present knowledge to obtain an efficiency of conversion in a gas turbine greater than 80 per cent. This, of course, is partly due to the high velocity of the issuing hot gases. To produce an efficient gas turbine, therefore, on the favorite cycle so much discussed recently, it is necessary, first, to have, as I have said, a very efficient compressor, a very efficient expanding nozzle, and every efficient conversion when the moving gases strike the turbine blades. Using the numbers I have suggested, of 90

per cent. efficiency of compression, 90 per cent. efficiency of nozzle expansion, and 80 per cent. efficiency of conversion in turbine, we have, with a cycle having negative work equal to 0.4, the following efficiencies: To get 0.4 of work in compression, we shall require 0.445 of work put into the compression. On expanding in the nozzle, we shall obtain 0.9 only of the total energy of the flame gases in the shape of kinetic energy, and of that 0.9 we shall only get 0.8 returned in the shape of available work by the turbine part. That is, we shall get a total work from the turbine of 0.72 , and deducting the negative work $0.72 - 0.445 = 0.275$; that is, from a cycle which should give us 0.6 in work, we shall only get 0.275, or about 22 per cent. The practical efficiency of an engine of this kind will only be 22 per cent., even assuming the high efficiencies of compression and jet expansion which I have mentioned. In my view, no such efficiencies of compression or jet expansion are at present known, and accordingly there appears no likelihood of the production of any gas turbine which can rival the reciprocating gas engine in efficiency and in economy. To produce such a turbine requires the solution of three problems:

1. An efficient turbine compressor, comparable in efficiency with cylinder compression.
2. An efficient nozzle expander with a higher efficiency than 90 per cent.
3. An efficiency of conversion of kinetic energy of the moving gases into work delivered at the turbine spindle, of greater than 80 per cent.

Either these problems must be satisfactorily solved, or else new materials discovered which will stand temperatures which at present melt fire-brick. The outlook, I fear, is not hopeful.

This thermal efficiency of 22 per cent. assumes no losses in the combustion chamber due to heat conduction, no losses in the expanding jet due to heat conduction, and no losses in the turbine itself from the same cause. Considering the losses in gas-engine cylinders of small size, it would not be too much to allow in a turbine a heat flow of at least 25 per cent. This, of course, reduces the efficiency from 22 per cent. to 16.5. In arriving at this figure, I have assumed that no greater loss would be incurred from heat flow in the turbine than in the cylinder engine; but even with reduced temperatures when striking the turbine, the very fact of requiring a reservoir for combustion to operate, and the forcing of the whole of the hot products through a relatively small nozzle, necessarily means greater loss than I have assumed. Assuming, however, no more loss than I have given, an engine with an efficiency of only

16 per cent. of the total heat given to it could not compete with internal combustion motors of existing construction. It may be said that the advantage of continuous rotation is so great that even at this low efficiency the gas turbine would be successful. Personally, I doubt it very much, because the mechanical difficulties with gas turbines would be much greater than the mechanical difficulties of the steam turbine.

In all steam turbines, as you, I am sure, know, it is necessary to work with relatively small clearances between the tips of the blades or shrouding and the enclosing casing. This is also true as to endwise clearance between fixed and moving blades. Comparatively small clearances are necessary for economy. The use of even temperatures so high as 400 or 500 degrees Centigrade, by introducing unequal expansions, greatly increase the difficulty of obtaining economy. No doubt if a plentiful supply of relatively low temperature gases under considerable pressures could be obtained, these gases might, with advantage, be expanded in a nozzle, and used to operate a turbine. To carry this idea into effect has already been attempted, as I have said, by Mr. Lanchester, and there is some hope of operating in this way. I fear, however, that the temperature of the gases in the exhaust in the gas engine are too high, as they stand, to be so used. Gases, however, from an exhaust or air supercompression engine, such as I have lately been working with, could, no doubt, give considerable efficiencies in turbines. I do not see, however, any solution of the gas turbine problem here, because the amount of energy available for the turbine after the gases leave the gas engine is too small for consideration in connection with any really high-power machines.

Some of the difficulties I have discussed with you have been mentioned by Dr. Lucke. He adopts the view that jet expansion is not as efficient as piston expansion; and here I agree with him. No doubt the type of jet expansion has to be carefully considered, and the efficiency of a jet as a means of converting the expansion from a high-pressure to a low into kinetic energy depends entirely upon its configuration, and the design of the proper areas and relative lengths for the nozzle. All this, however, is as yet a relatively new field, and much study will be required before any certainty can be attained in the design of expanding jets.

Professor Reeves, in another able article which I have already mentioned, differs from Dr. Lucke, and considers that he has overstated the difficulties of the expanding jet. He accordingly takes a more favorable view of the turbine problem. There is a great deal of truth, however, in what Dr.

Lucke has said. Even the best expanding jets yet known appear to have a low efficiency, and nothing is known of the efficiency of expansion starting from flame temperatures. Apart from the mechanical efficiency of the expansion, as I have already pointed out, the heat loss due to conductivity will be great in such nozzle.

I quite agree with Professor Reeves, however, that the more hopeful line for the gas turbine lies in the use of steam to provide the working fluid under compression without a compressor, and in the heating of this steam when produced by a very small quantity of combustible mixture of gas and air under pressure. Such a turbine would be a compromise between what I may call the flame turbine and the steam turbine, and it presents more possibilities; but its efficiency would not be high, although, no doubt, such a machine could be got to operate mechanically with fair success.

This line of work depends upon the fact that negative work may be greatly reduced by using steam as working fluid, when steam is heated highly by internal combustion of a relatively small amount of inflammable gas and air. This proposal is more hopeful, but for success, even it requires temperatures, in my view, too great for existing turbines to stand with economy. This proposal may be considered to be analogous to that of an excessive superheat, as used in an existing steam turbine.

Many methods have been discussed which depend upon the use of regenerators. I have a great distrust of regenerators, so far as engine work is concerned. Many able men have proposed regenerative contrivances, from the time of Stirling, in 1817, down to the present day; but I am not aware of any actual working engine which has ever succeeded in practice using a generator.

From what I have said, you will see that my view of the future of the gas turbine is not favorable; but, notwithstanding, the subject is so fascinating that many inventors and scientific men will doubtless continue to investigate the problem, and possibly new solutions may be discovered which are not dreamt of to-day. I am the last man in the world to deprecate daring in my practical and scientific work, but I would advise the junior engineers—members of our institution—to avoid the subject except as a scientific study. I fear there is little hope for a young man to make a position and a business success of any internal combustion turbine, so far as our present knowledge carries us.

An innovation in the form of a ladies' class was launched last week at the National Automobile School, at Oxford and Carlisle streets, Philadelphia. The idea seems to have been an instant hit, for no less than fifty-six names of Quaker chauffeuses to-be have been enrolled, with prospects of the class still growing.

A Few Notes on Lubrication.

By T. E. T.

The general theory of lubrication is the interposition of a soft mobile substance between two hard, rigid and rapidly moving substances to the end that the latter may be prevented from coming in actual contact with each other, for if two blocks of metal are rubbed one against the other without any intermediate substance between, it will not only take a considerable amount of power to keep them going, but will also wear them out very rapidly. When a film of oil, however, is placed between two metal surfaces, it will not only require less power to move them, but it will also prevent the wear consequent upon the rubbing of one surface against the other. It is the oil that wears, not the metal.

In selecting a suitable lubricant, therefore, for use on machinery of any kind, it is necessary that the interposing film shall have those qualities which will cause it to last or wear well, and the one quality which has most to do with this is the *cohesiveness* of the oil particles. The more these particles have a tendency to stick together, the more uniform and unbroken will be the cushion or film which is interposed between the metal surfaces.

Now all mineral oil disintegrates when subjected to heat—that is, the particles lose their tendency to adhere to each other, and show a tendency to separate as the temperature increases, and it therefore follows that the attribute which will determine a good lubricant is its ability to resist the heat generated by the rapid moving of the metal surfaces, between which it is acting as a cushion.

On ordinary machinery the amount of heat developed is not very great, and the difference between different oils, while noticeable, is not in most cases very vital. But in the cylinders of a gas engine, where the heat generated is so intense as to destroy anything with which it comes in contact almost instantly, it is absolutely essential that the oil used be selected with the utmost care.

In selecting, therefore, an oil with reference to its particular adaptability to the purposes under discussion, it is necessary to ascertain two things—(1) its ability to resist heat, which will indicate its efficiency as a lubricant up to the point where it commences to burn; and (2) the cleanness with which it will burn up after it has passed that point; for in burning up, as the oil does as soon as it comes in contact with the great heat in the explosion chamber, it leaves behind it a carbonaceous residue, which is probably the cause of more kinds of minor troubles than any other one thing connected with automobiling.

The amount of heat that an oil will stand and the amount of carbon that it will deposit after it is burned up are both readily ascertainable by the employment of physical tests, and if the oils are good in proportion

as they possess these qualities, and bad in proportion as they do not possess them, the selection of a good lubricating oil for gas engines should be a matter of mathematical certainty. There is no room whatever for argument, no room whatever for difference of opinion, for any chemist can tell you exactly what "fire test" an oil has, and exactly what per cent. of its own weight in carbon it will deposit upon decomposition by heat.

The whole purpose of this discussion is to show how unnecessary it is for automobile manufacturers or others interested in the securing of the best grade of gas engine oil, to exercise other than ordinary business intelligence and care in their purchases. No one would think of buying parts without submitting them to a series of tests which were known to have a bearing upon their suitability for the uses to which they were to be put, why then should not the oil which plays so important a part in the co-operation of these parts be selected in the same way?

While practical tests are good things, they are frequently deceiving unless carried on over a great length of time and under a great variety of conditions. Figures do not lie, particularly when they refer to fixed conditions, and if the oils used on automobiles were actually tested before being put in the machine, an endless amount of trouble would be avoided.

ROADS THAT TEST CARS.

Recently a party of mechanical experts from the Pope Manufacturing Company, consisting of V. M. Palmer, C. A. Huntington, A. M. Dean, E. C. Kauffman, Fred E. Brown and J. A. Shearer, drove over the road from Hagerstown to Cumberland, Md., in three of the company's new Model V Pope touring cars. The trip was, in a measure, a trial to test the car's capabilities, which proved highly satisfactory. The party reported that for miles between Hancock and Cumberland, where there were five mountains to cross, the road was unbroken, and in many places in the mountains the snow was sixteen inches deep. The party spent the night in Cumberland, at the Hotel Tremont, and after breakfast set out for the return trip to Hagerstown, which was successfully accomplished.

Possibilities of the gasoline railroad motor car are fully realized by the farmers of Kansas. Ever since the successful trials of the Union Pacific motor cars the residents of small Kansas towns have complained of the inadequate railroad service and besought the railroad company to put cars of this type into regular service on its short lines. It is evident that profitable use can be found for these cars as fast as they can be turned out by the shops.

A Philadelphia-Pittsburg Improved Highway.

Automobile Club of Germantown Will Work for the Idea Advanced First by a Railroad Official.

PHILADELPHIA, April 2.—Treasurer Robert P. Hooper, of the Automobile Club of Germantown, one of the leading spirits in that organization and among the first to induce it to take up in earnest the work of building a Philadelphia-Pittsburg highway—or, rather, improving it, for the roads are already there—was seen at his office by THE AUTOMOBILE representative, and talked entertainingly on the subject.

"The idea," said Mr. Hooper, "was first brought forcibly to our minds by Third Vice-President Rea, of the Pennsylvania Railroad, for the reason that the Germantown club is, to all intents and purposes, a long-distance touring club. The majority of its 190 members own cars, and from time to time—every week in the summer season—take trips varying from 200 to 1,000 miles or more in length. We have always favored road improvement, and when Mr. Rea set forth his plans at a little dinner at our

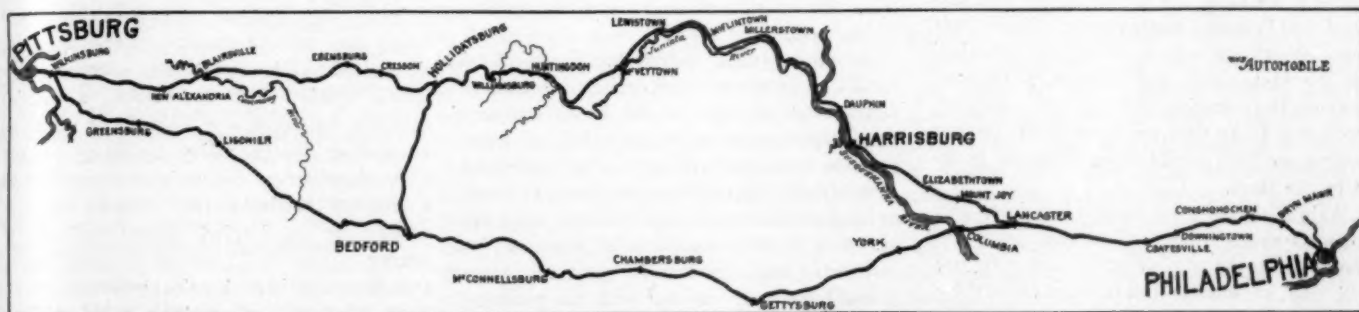
that the road through whole counties may be put into condition at one time. We do not anticipate any serious opposition, because the farmers and inn-keepers along this route seem to realize the benefits its rehabilitation will bring with it. Besides, many township and county officials along the route we have already discovered, and automobilists themselves are as interested in the project as we are.

"Our first object will be the improvement of the Southern route through Columbus, York, Gettysburg, Chambersburg, Bedford and Greensburg. By the time that is completed its advantages will have become so apparent, not alone to the automobilists, but to farmers, merchants, and county, town and state road officials as well, that the improvement of a more Northern alternative route through Harrisburg, Lewistown, Huntingdon, Hollidaysburg, Cresson, Ebensburg and Blairsville will be comparatively

provement Company, formerly the old Philadelphia and Lancaster turnpike, is excellent, but from Paoli to Lancaster much of the route is not well maintained. From Lancaster via Columbia to York, and thence to historic Gettysburg, where junction is made with the old turnpike from Baltimore (only 52 miles distant from Gettysburg), thence across South Mountain, well remembered as the line of retreat of Lee's army after the battle of Gettysburg, thence into the beautiful Cumberland valley at Chambersburg, where our route joins the turnpike from Harrisburg.

"From Chambersburg westward we cross a number of mountains, Sideling hill, Tuscarora mountain, and others, and after a beautiful run of fifty miles reach Bedford, famous for years as a cure and summer resort. The route then crosses the main Allegheny range, the Somerset plateau, Laurel Hill mountain, and into Ligonier valley; thence through the gap in Chestnut ridge, cut by the Loyalhanna river, it rises through Grunsburg, Irwin, Turtle creek and into Pittsburg, ninety miles from Bedford.

"This is the direct route across the state, between the two large cities of the state, and



clubhouse recently his ideas seemed to touch a popular chord. The mayor of the city was present, and, an enthusiastic automobilist himself, showed such an interest in the proposed scheme that even the most conservative of our members saw its possibilities, and we then and there pledged our best efforts to forward it in every legitimate way.

"The plan upon which we are working just now"—and he pointed to a 6 by 4 foot map of Pennsylvania spread out on a table, and showing the route in broad black lines—"is to interest every automobilist living within twenty-five miles of it, along its entire length of 297 miles—which, by the way, is about sixty miles shorter than the railroad distance. Through them we hope to interest the officials of the various townships and counties through which the route passes; urge them to apply for improvement of the road (of which expense the state will pay 75 per cent., the county and township between them paying the other 25 per cent.), and in this way before the end of the present year we will have possibly 100 miles of the distance macadamized in stretches varying from one to five or more miles, although it is not improbable

easy of accomplishment. Then will follow other improvement schemes—Pittsburg to Erie, Philadelphia-Scranton, etc."

In his letter to the Germantown club Mr. Rea outlined his ideas as follows:

"I desire to call the attention of your club," writes Mr. Rea, "to the necessity of having improved highways, particularly main roads, within our state, in order that the full pleasure of motoring may be realized and so that our state may thereby reap the benefit of the increased travel through it. . . . The investment now being made in this country in motor cars is enormous, and in the owners we have an army of enterprising citizens, ready and willing to work in improvements.

"No better beginning could be made in road improvement under our present laws than to encourage the building of a first-class road on a direct route between the two great cities of Philadelphia and Pittsburg, the eastern and western confines of the state. How many realize that the distance between these two cities is only about 284 miles by the old direct stage route? Seventy miles shorter than the shortest railroad line.

"From Philadelphia to Paoli, 20 miles, the toll road of the Lancaster Avenue Im-

is the one which, in my judgment, should first be put into condition for travel. Then the improvement of others would soon follow. For instance, what was known as the Northern turnpike, from Pittsburg eastward, via Blairsville, Ebensburg, Hollidaysburg, Huntingdon, and down the Juniata valley to Harrisburg and on to Lancaster, could in part be taken up in connection with or soon after the first main road is completed.

"Ebensburg, situated on top of the Allegheny mountains, is becoming an important summer resort, as well as the center of a large coal development, and if the Northern turnpinke from Pittsburg was rehabilitated and put in good condition through that place, thence to Hollidaysburg (and Altoona); then, with the improvement of the thirty-two miles between Hollidaysburg and Bedford, connection could be had with the main route described. This would furnish an excellent route between the Ebensburg and Bedford resorts, the populous section around Altoona, and a circular route from Pittsburg of about 210 miles for the motorists of western Pennsylvania.

"Likewise in the east, the two routes via Lancaster and Reading, between Philadel-

phia and Harrisburg, would become popular, not to mention many others.

"Now, it appears to me that the state, having provided the method of securing these good main roads, and what is more important, having appropriated a large sum of money which is now available, out of which it will pay 75 per cent. of the cost, it remains for our citizens to take up this work, cooperate with the State Highway Department, and in a few years we can have a system of highways of which we may be proud. And what would the improvement cost? Not much, when a state's welfare is concerned. The road with its foundation exists, and I doubt if many changes of grade or deviations in alignment need be considered. The turnpikes were generally laid out as straight as possible with maximum hills of 5 degrees, which, put another way, means 8.75 feet per hundred, which is not excessive for motor cars. Allowing for the twenty miles of good roads at the Philadelphia end, and fourteen additional miles for good stretches intermediately and into Pittsburg, would leave 250 miles to be rehabilitated.

"On the long, steep hills to eliminate dust and cost of maintenance, a binder should be added something like the so-called bitulithic road. This would aggregate only \$2,500,000 three-fourths of which would be furnished by the state, and the balance distributed through the counties, and I do not exaggerate when I say that no other improvement costing so little would bring so much benefit to the state.

"While there is no body of people, perhaps, as much interested in such improvements as motor car owners, I am sure you will find an intense interest among others throughout the route. . . . The old tavern stands and stage houses would be repaired and reopened, just as they have been in England, and the influx of visitors to and through the state would be surprising. Therefore the financial benefits of this main highway to the residents and the part it will play in the ultimate development of the interior of the state will, I am sure, be appreciated."

NEW JERSEY AFTER MORE ROADS.

TRENTON, N. J., April 2.—Assemblyman Miller of Cumberland county has introduced a bill into the legislature that has for its special object the macadamizing and improvement of the highways crossing New Jersey in a general way between New York and Philadelphia, formerly known as the "Great Roads."

The measure provides for the creation of a State Board of Public Highways, to consist of the Governor, the State Treasurer, the Secretary of State, the State Controller, and the State Road Commissioner. Authority is given to raise money for the work and to employ convict labor, if the latter is thought to be desirable. The new department is not to interfere with the present department.

THE CUMBERLAND ROAD.

Bill Introduced in Congress to Rebuild the Famous Old National Highway.

WASHINGTON, D. C., April 3.—Automobilists throughout the country will be interested in a bill introduced in Congress this week by Representative Pearre, of Maryland, to authorize the restoration of the Cumberland road by the United States Government, and to provide for its reconstruction and maintenance. The preamble of the bill sets forth in detail that by an act of Congress approved by President Thomas Jefferson on March 29, 1806, and by subsequent acts, a great national highway was constructed by the government from Cumberland, Md., through the states of Maryland, West Virginia, Pennsylvania, Ohio and Indiana, and surveyed through Illinois to the capital of Missouri. By the act of March 29, 1806, and thirty-three subsequent acts of Congress between 1806 and 1844, the sum of \$6,824,919 was expended by the government in the construction and maintenance of this great public highway, which carried thousands of population and millions of wealth into the West, and "more than any other material structure in the land served to harmonize and strengthen, if not save, the Union."

As the states to which the Cumberland road was surrendered have failed to keep it repaired as required by the acts of surrender, Representative Pearre's bill provides that the President of the United States be authorized to appoint a commission of three or more disinterested citizens to examine into the present condition of the road in the states mentioned and report the same to the President, together with the probable cost in each state of putting the same road into first-class condition as a macadam roadway. The bill carries with it an appropriation of \$30,000 to enable the President to meet the expense of the inquiry.

It further provides that upon the application of the proper authorities representing the states of Maryland, West Virginia, Pennsylvania, Ohio, Indiana, Illinois and Missouri, or any of them, the United States government shall loan to these states, or any of them, for the rebuilding and construction of the above-named national highway a sum not to exceed \$10,000 per mile, without interest, in payment for actual work done, provided the highway is repaired and constructed under the supervision of the commission provided for and according to specifications prepared by it. The further provision is made that one-twenty-fifth of the money received from the federal government and expended upon such road be returned each year to the federal treasury by each state receiving the same until the whole amount shall have been returned. The Secretary of the Treasury is given authority to make all necessary arrangements with the states mentioned with respect to the loan. The bill also requests the President of the United States

to lay before Congress shortly after the commencement of each session a statement of all proceedings under the proposed law.

This is a matter of vital interest to automobilists in all the vast section embraced in the bill, and Representative Pearre should be encouraged to press his bill to a speedy enactment. The restoration of this famous highway would give automobilists a touring ground unequaled in this country.

LIGHTS FOR HORSE VEHICLES.

TRENTON, N. J., April 3.—Assemblyman Perkins, chairman of the Judiciary Committee, which has charge of the drastic Frelinghuysen bill, is the sponsor of a new measure which provides that all vehicles drawn by horses on the public roads shall be equipped with two lamps, and that these lamps shall be kept lighted from one hour after sunset to one hour before sunrise. The proposed law, according to its advocates, is intended only to place the danger of accidents on the roads at a minimum, and is not a case of the automobilist trying to get back at the horseman.

The Wright bill recently introduced makes it a misdemeanor for any person driving any vehicle not to slow down when any person coming in the opposite direction shall so request with the up-lifted hand. It is also made a misdemeanor to drive any vehicle at a speed exceeding thirty miles an hour or for any chauffeur or other driver to take out a vehicle without the consent of the owner, or to display false numbers or marks. The bill carries a penalty of \$500 fine, or sixty days' imprisonment, or both. It was referred to the Judiciary Committee, and it might be noted that Assemblyman Perkins is the chairman of this committee.

SHOW TALK FROM INDIANA.

INDIANAPOLIS, April 2.—It is probable that an automobile show will be held in this city within the next two months exclusively for local dealers and manufacturers. Plans for the show are in the hands of S. W. Elston, manager of the Indiana Automobile Company, who will make an effort to interest dealers and manufacturers in the project. The only building of sufficient size for a show is the new markethouse, which is well adapted for such an exhibition. This building is one story high, with a cement floor and driveways running through it from all sides. It is about 300 feet square and has a roof almost entirely of glass. Elston is now trying to induce the city authorities to rent the building for the purpose for one week.

It is thought that the eight garages, carrying lines of twenty-three different makes, together with the eight factories and the various makers of tires and automobile parts could make an excellent showing at the projected exhibition.

Among the Automobile Clubs.

Clearing House for Complaints, Proposed by Charles T. Terry, Adopted by New York State Association.

Charles Thaddeus Terry, professor of the Columbia Law School and attorney for the National Association of Automobile Manufacturers, at the recent annual meeting of the New York State Automobile Association of the A. A. A., suggested a plan whereby the automobile club would serve as a clearing house of complaints in its vicinity. The Board of Directors thought so well of the idea that it was adopted, and Secretary Elliott was directed to notify New York club secretaries of the action taken. Herewith is the method of procedure proposed by Mr. Terry:

"First—To have the club adopt as a part of its by-laws a provision for a complaint or grievance committee or bureau, to consist of from five to ten members. This committee should perform the duty of considering any complaints of injury by automobilists, whether members of the club or not, and any complaint of reckless driving or other violations of the law, hearing what proofs in that regard any complainant had to offer. If the offense were committed by a member of the club, he should be examined by the committee, the charge read to him and his statement taken with reference to his version, if he claims that he was not guilty of any wrong. If he pleads guilty, or, if upon investigation the committee finds him guilty, he should be punished by the club by the imposition of a fine, graded say from \$5 to \$20. If the offense were a flagrant one and wilful or grossly negligent, or if it were a second offense, he should, in addition to the fine, be suspended for a proper period, proportionate to the offense; for inexcusable offenses or third offenses, he should be expelled, when found guilty.

"Second—In the case of complaints against those not members of the club, the statement of the complainant should be heard by the committee, together with the statements of any witnesses who could corroborate such complaint. If it appears to the committee that a good prima facie case is made out, the committee should invite the offender to reply to the charges. If he should fail to reply, or if upon making his reply the committee is not satisfied that he has met the charges, the committee or some member of the committee should obtain a warrant and attend to the arrest and prosecution of the offender, perhaps through the attorney for the club.

"Third—In case the complainant is able to stand the expense, the committee should have him deposit upon the entering of the complaint a sum reasonably sufficient to cover the expense, reimbursing him the balance, if any, after the case shall have been finished.

"Fourth—If the complainant in the case of complaints against non-club members is not able to stand the expense in whole or in part, the balance of the expense, within reasonable bounds, should be paid by the club.

"Of course the plan involves the possibility of the expenditures of some moneys by the club, but in the long run I think it would be a saving in the matter of fines inflicted by the courts under statutes passed in pursuance of the well-known hostility on the part of certain elements in the community. If, as I judge, such a system would transform

the present hostility to a feeling of friendliness, the expensive machinery of registering, providing numbers, procuring licenses, paying fines, would eventually be discarded and ultimately prove our plan an economical one."

Asa Goddard Goes to Cleveland Club.

WORCESTER, MASS., April 2.—Asa Goddard has been appointed secretary of the Cleveland Automobile Club, and yesterday left Worcester to assume the duties of the office immediately on arrival in Cleveland. Mr. Goddard has been considering the offer for some time, and the position carries a substantial salary, besides being one of the most important in Ohio automobile circles.

Mr. Goddard will immediately begin a campaign for the organization of the automobilists of the state. The club also plans to take an active part in the advancement of good roads interests in Ohio, and also in legislation favorable to automobilists.

Mr. Goddard received the appointment as the result of his work in automobile circles in Worcester and vicinity. He organized the Worcester Automobile Club and leaves it in a very flourishing condition. The contest on Dead Horse hill last year attracted favorable attention throughout the country, and its success was due, in a large measure, to the hard work of Mr. Goddard. Now more forcibly than ever members of the Worcester club recognize the fact that there will never be another climb of such importance as that of last year on Dead Horse hill, as it had been left to Mr. Goddard to win the consent of the Leicester authorities to hold another contest.

Tacoma Club's Road Campaign.

TACOMA, WASH., April 2.—The Tacoma Automobile Club, at its recent annual meeting, commenced a campaign for an automobile road between this city and South Tacoma. The purpose is to have the present bicycle path widened to 24 feet, and designated for the use of both classes of vehicles. This will be a notable improvement, and will make it possible to reach the prairie roads south of here at all seasons of the year. During the rainy season it is impossible to negotiate this three-mile stretch because of the muddy condition of the regular road. It is not believed that the wheelmen of the city will object, especially as the automobilists propose to widen the path at their own expense.

Once this road is completed, a great improvement will have been effected, which will be greatly in the interest of touring. One of the automobiling features of Tacoma are the prairie roads, which are always in good condition, and extend in all directions through a district of about 150 square miles. The principal highway con-

tinues on to Mount Tacoma. Making this mountain accessible to autos at all seasons of the year is greatly desired, as such a road will prove quite an attraction to touring automobilists.

Considerable attention is being paid to the subject of fast driving, and members of the club feel that some of the drivers are willfully violating the existing laws. The campaign will begin with trying to induce all automobilists to join the club, after which they will be liable to reproof by the Caution Committee, consisting of A. F. Alexander, John M. Bell, S. M. Jackson and W. W. Pickerill, which was elected at this meeting. It will get busy at once, and will work in conjunction with the membership committee.

The Tacoma club is a very prosperous one, and new machines are daily arriving. The following officers were elected at the annual meeting: President, W. W. Pickerill; vice-president, W. O. Williams; secretary, Dell Young; treasurer, A. G. Prichard.

Bungalow for Washingtonians.

WASHINGTON, D. C., April 2.—Plans have been drawn for a bungalow to be erected by the Automobile Club of Washington on grounds adjacent to the Villa Flora Club, several miles out the Brightwood road. The plans call for a spacious building with porches running around three sides of the bungalow. There will be lounging rooms, a dining room and a general reception room, and all the conveniences of a country clubhouse. It is expected that work will be commenced at once and that the building will be ready for occupancy early in May.

The club is in a very prosperous condition and is making its influence felt every day, particularly in opposing legislation inimical to the interests of the automobilists. If the Sims automobile bill is killed in Congress it will be due solely to the efforts of the club, which has taken a very prominent part in the hearings before the congressional committees.

The Progressive Minneapolitans.

MINNEAPOLIS, MINN., April 3.—The members of the Minneapolis Automobile Club are planning to make their organization the largest of its kind in the country, and are arriving at their aim in a strictly business-like manner. At present there are about 500 on the membership rolls of the club, but it is expected that before the first of the summer this number will be nearly doubled. The dealers estimate that 500 new machines will be purchased this spring, while about the same number who own machines in the city do not belong to the club. It is planned to put a solicitor to work April 1, with a view to bringing the larger part of these into the club. He will visit each of those who are eligible to membership in person, and will explain to them

the principles of the club, and also its aims and intentions.

At the recent meeting of the Board of Directors last week it was decided that the club make its headquarters during the coming summer at the Plaza Hotel, where has been secured the use of a large separate room with a special entrance. During the busiest part of the summer, from June 1 until the end of October, someone will be constantly in attendance to furnish the members of the club any desired information.

The directors also took preliminary steps to furnish a good roadway to St. Paul, as at the present time the roads between the two cities are a standing disgrace. It is understood that the club will bear the larger part of the expense, and the city will also assist, the aldermen from the Twelfth ward having given their promise to that effect. The treasury of the organization is in excellent condition, and well able to bear the expense that this plan will necessitate. It is estimated that the improvements will cost in the neighborhood of \$5,000.

Grand Rapids Club Plans Tours.

GRAND RAPIDS, MICH., April 2.—A meeting of the Grand Rapids Automobile Club will be held on the first Monday in May for the purpose of electing officers and forming plans for the coming season. The local association is at present in a flourishing condition, with a large membership and prospects for a most successful season. The long tours, which proved so successful last year, will no doubt again be instituted. A trip to Chicago, or even to Milwaukee, is the journey planned by several members of the club. At the May meeting a committee will be appointed by President Schurtz to decide on these trips.

The new seven-mile boulevard from this city to Jenison, completed last year by the Boulevard Association, is likely to find much favor with automobilists this season. The boulevard passes a group of historic Indian mounds, and leads through the pretty little village of Grandville. The road, for nearly its whole length, is along the banks of Grand river in one of its prettiest portions.

Hoosiers Will Have Big Club.

INDIANAPOLIS, IND., April 2.—One of the largest automobile clubs in the West is being organized here, and, backed by plenty of money, it promises to be a success. It is thought that it will have about 400 members, and a meeting to elect officers and plan for the future will be held in a few days. It will be known as the Indianapolis Motor Boat and Automobile Club. A lease has already been obtained for a period of ten years on a piece of ground, with a frontage of 300 feet on White river, at Broad Ripple Park, north of this city, and a modern clubhouse will be erected before the season is over. The new organization is in reality the outgrowth of the Indian-

apolis Launch Club, whose house boat went down in the river a few days ago. The old club's membership was limited to owners of motor boats, but the new club will also include owners of automobiles. A part of the plan is to have a large garage for the benefit of the members.

Peorians Entertain Farson and Gorham.

PEORIA, ILL., April 3.—The second annual "positive feed" of the Peoria Automobile Club was held on Monday of last week and was the occasion of much good cheer, the distinguished guests including President John Farson and Secretary Sidney Gorham, of the American Automobile Association. Mr. Farson responded to the toast of "Good Roads" and Mr. Gorham, who is also president of the Illinois State Association, spoke on "Organization and Its Effects on Automobile Legislation." Representatives were also present from Bloomington, Rockford and Henry. The menu card was well arranged and was replete with pointed allusions to practical automobiling terms, the punch being alluded to as "direct drive," the broiled chicken—"without running gear," and the cheese as "60-horsepower."

Cincinnati Clean Streets Parade.

CINCINNATI, O., April 2.—The Cincinnati Automobile Club will hold its yearly parade this year in conjunction with the Clean Streets Parade to be held on April 9. The Clean Streets Convention committee has also asked every firm which has commercial trucks to have them in line.

The Cincinnati Automobile Club has appointed President Val Duttonhofer as marshal, and Gordon Neff to be chief of staff, with the following assistants: Foster Bradley, Harry B. Crane, Dr. L. S. Colter and Stanley Hooker.

Quakers Interested in Runs.

PHILADELPHIA, April 3.—The plans of the Automobile Club of Philadelphia for the coming season call for a large committee on tours and runs, and President Dick has appointed the following: H. Bartol Brazier, chairman; Dr. J. P. Fristmuth, Howard Longstreth, Stedman Bent, H. Allan Dalley, G. B. Fletcher and W. L. Griffith.

General Club Doings.

BROOKLYN.—At a recent meeting of the Long Island Automobile Club a resolution to create an associate membership was carried. An entrance fee of \$10 will be charged for this division of membership, which will be entitled to all the privileges of the club with the exception of the right to hold office and to vote. An interesting paper was read at the meeting on a new axle, which, it was claimed, will do away with skidding.

DALLAS, TEX.—Col. John G. Hunter, president of the Automobile Club of Dallas,

has called a meeting of the organization for April 10 to arrange a program of tours and runs for the coming season. The club was organized a year ago and now has a membership of forty.

THE MOTORCYCLE DIVISION

NEW YORK.—An elaborate program of touring, racing and hill climbing has been arranged by the New York Motorcycle Club. The season will be opened with a century run to Patchogue, L. I., and return, and there will be a hill-climbing contest on May 30. Other events, the definite dates for which have not been set, are as follows: June—Brooklyn and New York Motor Cycle Club, fifty-mile inter-club reliability contest for Nelson trophy and closed photo run; July—Tour to Rochester; July—Run to West Point and a speed contest; August—Run to Stamford and clam bake and a Brooklyn and New York Motorcycle Club fifty-mile inter-club contest for Brooklyn Motorcycle Club trophy. In September there will be runs to Hightstown, a reliability and judgment run to Bedford, N. Y., and return and a gymkhana contest for prizes. The October events include a Saturday and Sunday run to Newburgh and return and a full century run on Long Island.

MUSKEGON, MICH.—At a meeting of the Muskegon Motorcycle Club it was decided to hold the annual track meet on Labor Day. The club will go to Chicago Decoration Day for a meet with the Chicago club, and to Milwaukee on July 4 for a meeting with the Milwaukee club. The club plans a series of tours through Michigan this season, and Alphonse Gagnon has been selected as lieutenant to aid Captain Milo Pray to arrange the schedule.

PHILADELPHIA.—The season of club runs of the Philadelphia Motorcycle Club will open on the first Sunday in May with a run from the clubhouse, 2513 North Broad street, to League Island, thence to Gunner's Run, to Ogontz and back to the clubhouse, where a luncheon will be served to all participants.

"MOUNTAINEER" LEAVES DENVER.

DENVER, COLO., March 29.—A considerable party of automobile enthusiasts, headed by Dr. F. L. Bartlett, president of the Denver Automobile Club; E. Linn Mathewson, a local dealer and personal friend of the writer; and H. B. Robinson, manager of the Reo branch in Denver, drove out from this city to escort the transcontinental party into town.

We are leaving here this morning, having changed our course in an effort to reach Omaha in time for the automobile show to open there April 4. I am bound to see at least one automobile show this winter, and unless we should wait in Denver until the middle of April, the Omaha exposition seems our last hope.

PERCY F. MEGARGEL.

Letter Box

Concerning the Two-cycle Motor.

Editor The Automobile:

[328.]—As a mechanical engineer and a subscriber to your valued paper, I send you the following remarks, based upon a considerable experience with the two-cycle automobile motor, in the hope that they may possibly prove interesting to those of your readers who are following the development of the two-cycle motor for automobile propulsion.

In your issue of February 1 there is a very comprehensive article upon two-cycle and four-cycle engines, by C. P. Malcolm, in which I note several statements that seem misleading, and as the whole amount of data to which a designer may refer is extremely limited, it seems that these statements should not be allowed to go uncontroverted.

1st. Mr. Malcolm states that space in the crankcase should, so far as possible, be economical, and that the compression in the crankcase will be from 3 to 5 pounds, according to how closely the space is economized, care being taken to make the case gas-tight.

2d. Mr. Malcolm states that "when the engine is running at reasonably fast speed, however, the charge is entering the cylinder from the crank-chamber at a high speed when the piston begins its up stroke, and the inertia of this rapid current of gases will make it impossible for any back-flow to set in, within the infinitely small space of time between the commencement of the up-stroke and the closing of the intake port."

3d. Mr. Malcolm advocates the use of a hinged aluminum leather-faced check-valve admission to crankcase, instead of a port covered and uncovered by the piston.

4th. Mr. Malcolm makes the statement that a stronger spark will be required to fire the charge in a two-cycle than in a four-cycle, basing the assertion upon the claim that the two-cycle charge is relatively less pure than the four-cycle.

Now I will take up these points in order, and answer them in accordance with the knowledge gained from a careful experimental study of a two-cycle, two-cylinder, water-cooled horizontal automobile engine of a well-known make, which has carried me at least 5,000 miles during the past season, and which has never failed to operate even under the most adverse conditions, as long as supplied with oil.

1st. Regarding Compression—my engine has 3-inch babbitted bearings with no stuffing boxes or their equivalent. The bearings were rebabbitted and the engine was set up and driven from countershaft at approximately 200 R. P. M., with a gauge on the crankcase. The gauge showed a pressure of 41-2 pounds maximum.

Next the crankshaft was removed and blocks were fitted to the crankcheeks (none being used previously), with the result that at the same speed the gauge showed 7 pounds compression in the case. At 250 R. P. M., the gauge showed 8 pounds, and at 350 R. P. M., 8 1-2 pounds compression in the case. The normal speed of this engine is 800 to 900 R. P. M., but as it would be out of the question to read a gauge at such a speed, the compression at normal speed can only be estimated. If there were absolutely no leakage by the piston rings or in the bearings, the compression would not vary appreciably at different speeds.

If I had gone still further, and blocked up the interior of my pistons, leaving room only for the connecting rod, I could have realized

a considerably higher pressure in the case. These results are the actual gauge readings obtained and can be reproduced at any time.

2d. Regard Velocity of Charge Through Transfer Passage—Mr. Malcolm's idea appears to be that the velocity of the charge through the transfer passage depends upon the piston speed, whereas the fact is that the velocity is a function of the crankcase pressure at the time of the transfer port opening to the cylinder, modified of course by the effect of a possible remanent exhaust gas pressure in the cylinder at the instant the port opens from the transfer passage.

A little reflection will show that this must be so, since at the time of admission to the cylinder the piston is traveling at a low rate of speed and constantly moving slower as it approaches the center or point where it reverses its motion, while the charge in the case, which is being compressed and is therefore changing a portion of the kinetic energy of the piston into the potential energy of pressure, is at its maximum value and capable of moving, when released, at a much greater velocity than could be imparted by the piston.

Furthermore, if we neglect the loss due to the heat of compression and case leakage, it will be manifest that the case compression will have a constant maximum value, since it depends upon the relation between the case-volume when the piston is just on the point of closing the intake from the carburetor, and the case-volume when the piston is just on the point of opening the transfer port to the cylinder, both of these quantities being constant.

3d. Concerning Check Valves—While the use of a check valve in the admission to the crankcase presents certain advantages, as Mr. Malcolm clearly shows, yet it is extremely doubtful in the writer's mind whether it would be possible to employ such a scheme for high-speed work, although for moderate speeds of 500 R. P. M. to 700 R. P. M. it might answer. It has been quite generally demonstrated, to the satisfaction at least of those who have had to do with high-speed two-cycle engines, that is, speeds from 800 R. P. M. to 1,500 R. P. M., that the three-port system offers the least wire-drawing and therefore the best solution of the problem.

4th. Concerning Ignition—While Mr. Malcolm's statement cannot be disputed upon theoretical grounds, yet the following facts may not be without interest: My engine was originally equipped with a timer built on the platinum-tipped screw and spring plan, the spring being brought into contact with the screw by means of a cam, which was so designed as to give a very long contact, the idea being of course that a long contact was necessary to fire the charge.

However, it proved so destructive of batteries that I replaced it with a popular make of timer with a "snap-off" contact, the duration of the contact being less than a third of the old one.

This experiment was successful, and demonstrated clearly that timers, as built for four-cycle engines, are perfectly suitable for two-cycles.

If Mr. Malcolm means that the spark must be hotter for a two-cycle, I would say that in consideration of the fact that the heat of the spark depends directly upon the amperage consumed by the coil, and that the same coil which will work satisfactorily on a four-cycle will work equally well on a two-cycle, the force of Mr. Malcolm's argument seems to be lost.

In conclusion, I shall be glad to answer any inquiries made by readers in regard to further details concerning this engine.

Lawrence, Mass.

Walter Scott.

Rate of Oil Feed for Proper Lubrication.

Editor The Automobile:

[329.]—What should be the proper oil feed. In drops per minute, for the cylinders of a vertical four-cylinder 3 1-2 by 5 water-cooled engine at high speed, oil fed only to one side of cylinders and rather near lower end? Also for crankshaft of same engine, say at 800 to 1,000 R. P. M.? The makers, or some one in their shop, say 20 drops per minute for cylinders, and 40 drops per minute for crankshaft, but this seems to me to be a rather too liberal dose and more intended to be sure that at least part of this oil will get there. I use gravity feed oiler. W. J. S.

Sandusky, O.

The "proper" oil feed in drops per minute for the cylinder of a vertical 3 1-2-inch by 5-inch water-cooled engine depends on so many different things that no hard-and-fast rule can be laid down which will meet all the conditions; however, in a case like the one under discussion, modern practice would call for a feed to each piston of about 12 drops a minute at 1,000 revolutions per minute, when a high-grade cylinder oil is used. For the crankshaft bearings half this amount would be ample, providing, of course, that the bearing surfaces were properly proportioned and fitted.

The minimum amount of oil which can be used in any particular case will be the amount which will prevent cutting or seizing of the lubricated surfaces. Any oil in excess of this quantity will evidently be wasted.

The minimum quantity which can be safely fed is usually a guess. In order to be on the safe side, however, most operators feed an amount many times in excess of the minimum.

For satisfactory lubrication of an automobile motor, the mechanical oiler is superior to the gravity oiler, because in the former the rate of feed varies with the speed of the motor, whereas in the latter the rate of feed remains constant, regardless of the variation of the motor speed.

Back Firing in the Carburetor.

Editor The Automobile:

[330.]—Please answer in your paper the cause of my engine back-firing in carburetor. The intake valve is closed before ignition takes place, and so I can't see where this back pressure comes from. I use a Holley carburetor on a two-cylinder car.

A Subscriber.

Peekskill-on-Hudson, N. Y.

Your trouble is probably due either to the ignition occurring too late, or to insufficient gasoline supply in the carburetor, which results in forming a "weak" mixture.

The effect of late ignition will be to keep the temperature of the exhaust gases which remain in the clearance space so high that they will ignite the incoming charge when the inlet valve opens.

The effect of an insufficient supply of gasoline will be, as already stated, to produce a "weak" mixture, and a "weak" mixture burns slowly, so slowly, in fact, that under certain conditions combustion is still going on in the clearance space when the inlet valve opens. In this case the incoming charge will be ignited.

Subscriber's trouble may be due to other causes, but in the absence of a fuller description of the motor in question, it is impossible to make any further suggestions.

Several young men of Kittery Point, Me., of a mechanical turn of mind, have fitted their boats with gasoline engines built by themselves. Some of these homemade craft, it is said, are among the fleetest of the auto-boats owned at the Point.

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Automobiling and the Roads Question. With astonishing progress the good roads question advances, and automobilists cannot avoid being a positive factor in the matter. From Pennsylvania comes the suggestion of a railroad official that the highway between Philadelphia and Pittsburg be improved so that it can be called a road, and it is to the Automobile Club of Germantown that the railroad man applies for assistance in the laudable undertaking.

In Congress a bill has been introduced calling for a reconstruction of the old Cumberland Road—known as the National Highway—while in New Jersey, that commonwealth of good thoroughfares, there arises an effort to construct main arteries of travel across the state. In New York State the county supervisors are busy preparing plans for the expenditure of the \$50,000,000 which last fall the people through a referendum decreed should be used in the next ten years on the highways of the Empire State.

In fact, from one end of the country to the other there is talk of better roads,

and the coming of the automobile is responsible for the general demand for the long delayed attention to them. The automobilists need not hide their influence for roads improvement, and the sooner this substantial army comes thoroughly into the open and works for something which is for the general good, the sooner will come the day of emancipation.

The Sprag in Its Modern Form

The sprag as an attachment for the automobile is not needed as frequently at the present day as it was earlier in the history of the movement, for there are few hills that even a moderately powered car cannot climb, and sudden failures of driving mechanism are rare, thanks to the progress made by builders. It occasionally happens, however, that the car needs something to hold it from backing down hill, and when such a necessity arrives it is apt to be an urgent one.

The early form of sprag was simple, consisting of a steel bar or perhaps two bars, pivoted to the rear part of the car, usually the rear axle, so that when not held up they would strike the ground at an angle and any backward movement of the car would cause their sharpened points to dig into the ground and stop the car. While this was a very simple and substantial device, it had the disadvantage that if the car acquired a little momentum by the failure of the sprag to "bite," owing to stones or hard ground, the sprag might be overridden, the rear end of the car lifting over it or the sprag bending. This was obviated in some cases by chaining the sprag so that it could not pass under the rear axle, but even then the device was decidedly primitive.

The modern sprag consists of a ratchet applied to some rotating part; on some foreign cars the countershaft is used, but the most approved practice is to place the ratchets on the rear hubs, as the breakage of a chain, though unlikely, is possible and would render the countershaft sprag useless. The ratchet sprag permits the car to gain no more momentum than can be gained while the pawl is moving the distance between two teeth. In any case the shock is cushioned by the tendency of the wheels to slip on the ground, and the sprag is probably as well able to slide the wheels as are the brakes. The ratchet sprag works under fixed conditions and its operation is not affected by the hardness or softness of the road surface.

Like many other details of the automobile, the ratchet sprag is a device that has been in common use in other work before it was "invented" for the automobile. As an instance, the inclined railway on Mount Washington, of hill climb fame, may be mentioned; the steam locomotives used on

this road are fitted with ratchet sprags to prevent running backward down-hill in case of the failure of other safety appliances.

An Injustice Worked by the Law.

In the street traffic rules about to be put into force by the Chicago police department there is understood to be a clause requiring all vehicles driven on the streets to carry lighted lamps at night. This is not a promulgation of a new law in that city. Just a decade ago the Chicago Associated Cycling Clubs won a hard-fought battle to place a "universal lights" law among the city ordinances, succeeding only because the Carter Harrison municipal administration was favorably disposed toward cycling and cyclists.

Necessary as was the carrying of lights at night by all vehicles as a measure of safety ten years ago, the need is much more apparent to-day, not only in our large cities but even more imperatively in the poorly lighted villages and on the country roads.

In this connection the remarks of a British judge at Winchester, England, in passing upon a suit for damages brought by the owner of a horse and trap who drove into the rear of an unlighted brewer's truck, are very much to the point. He held that the brewer and his men were "guilty of the grossest possible negligence. It amounted, in fact, to a total and reckless disregard of danger to life which might cause endless trouble and calamity."

A "universal lighting" bill is now before the British Parliament.

Automobilists here and abroad are willing enough to discuss the complaints made by other users of the highways against the glare of acetylene gas headlights on their cars and to adopt reasonable means for lessening the annoyance, but horse drivers do not manifest any reciprocal willingness to adopt the most obvious means for preventing accidents to themselves and to others by attaching lighted lamps or lanterns to their vehicles when they go upon the roads after dark.

The unfairness of the attitude of the drivers of horse-drawn vehicles in general is patent when it is considered that their refusal to light their own slow-moving and cumbersome wagons obliges the automobilist to pay hundreds of dollars for the strongest searchlights or headlights in addition to his oil side and tail lights, and for the gas or carbide to use with them, in order to insure himself against accidents for the avoidance of which he, who takes all of the precautions, must at the same time shoulder all of the responsibility.

If our lawmakers would make highway traveling safer, it is clearly "up to" them to incorporate in their licensing and speed-restraining measures a clause requiring all vehicles using the streets or roads at night to be provided with lighted lamps after dark that shall be visible from behind as well as from in front.

Many Entries for the Grand Prix.

European Substitute for the Gordon Bennett Will Be Hard Fought—Entries Are Numerous.

PARIS, March 24.—Up to the time of writing, three French firms have entered for the Grand Prix of the Automobile Club of France.

The Darracq firm secured first position on the list with Hémerly, Wagner, and Hanriot as drivers; Panhard & Levassor came next with Heath, Teste, and Tart as their champions, and the Brasier trio to replace the famous Théry, Caillois, and Stead is officially entered as Baras, Lebrun, and Barillier.

A large addition to this list may be expected during the next few days, all the constructors here being well advanced in their preparations for the great race, and drivers in many cases already selected.

The Renault firm has secured the services of Sisiz, Edmond, and Richez; De Dietrich will confide the "Lorraine Cross" to the tried team of Gabriel, Rougier, and Duray; Bayard-Clément will have as chief of its team Albert Clément, eldest son of the great constructor, supported by Villemain and De La Touloubre.

Hotchkiss has yet only chosen two men for its team, Le Blon and Salleron; Serpollet, who is rather a doubtful starter, will confide his steamers to Pelzer and Chantiaud. Grégoire has selected Tavenaux, Renoncé, and Civelli de Bosch, better known in touring contest than in speed tests; Vulpès will be driven by Barriaux.

Amongst the Italian teams, Fiat and Itala have each selected their three drivers, the team for the former being Lancia, Nazaro, and Weillschott, and Cagno, Florio, and Fabry for the latter. The Marchand racer will be driven by Raggio.

The six-cylinder Mercedes will be entrusted to two foreigners, the Belgium Jenatzy and the phlegmatic Anglo-Saxon, Alexander Burton; a third member of the team has yet to be chosen.

Darracq, Panhard & Levassor, Renault, Brasier, De Dietrich, Clément and Hotchkiss drivers have all been over the circuit, either on last year's racers, powerful touring cars, or, as in the case of the Renault, on racers of this year's model.

The Itala drivers were last week the first of the foreign teams to test the circuit. All declare it to be exceptionally fast and perfect from every point of view. Owing to the special regulations requiring all repairs and changes of tires to be done by the drivers, the Itala racers have been given an increased wheelbase to provide storage room for the extra tires which will be carried and to allow space for the large gasoline tanks to be fitted.

Pont de Gennes has been chosen as the headquarters and starting point on the circuit. It is twelve miles from Le Mans, the only large town in the district, in a deserted

country, and is admirably placed for obtaining a good view of the road. From the grandstand it will be possible to see the racers rushing down the hill towards the finishing point for a distance of about a mile and a half. The railroad runs along this leg of the circuit, passing Pont de Gennes, and will thus render easy the transporting of the material necessary for the elaborate quarters required for weighing-in, storing the cars during the two days' race, and for building the grandstands.

The Grand Prix Regulations.

The official regulations for the Grand Prix have just been published. June 26 and 27 will be the dates for the race over the Sarthe course, distance being 375 miles each day, and three cars may be entered by every constructor, two or more firms building under the same license being considered as one firm. Entries will be received up to the evening of April 30 at ordinary fees, \$1,000 per car, and until May 15 on payment of double entrance fees.

After the first day's race the driver of a car may be changed if necessary, and the mechanic may be changed during the race, providing that this change takes place under the surveillance of the *commissionaires* and at one of the charging stations. As soon as a driver is engaged for the race the Automobile Club of France must be informed by registered letter.

The weight of the cars is fixed at 1,000 kilos (2,200 pounds), with an allowance of 152.5 pounds for magneto; lamps and brackets, horns, tools, and cushions are not included in this weight.

Two persons must be carried side by side on each car, the minimum weight to be 132 pounds.

At the end of the first day's race each car will be placed under the control of a *commissionaire*, who will cause it to be placed immediately in the closed park. The driver, after stopping his motor, will only be allowed to close gasoline and oil taps, after which the car will be pushed into its own compartment in the garage and must not be touched by anyone until the next day.

On the morning of the second day the cars will be handed over to each driver at his exact starting time, all filling of tanks, regulating, changing or repairs to tires, as well as cranking the motor, being done after the start has been given.

Weighing-in is to take place June 24, and special regulations will be issued later regarding this operation.

All repairs and recharging must be done by two men forming the crew of the car.

Each competing firm will have allotted to it two stations on the circuit, to be ac-

corded by the drawing of lots. No workmen will be allowed on the course.

Stores and fuel may be placed on the edge of the road, but must be handled exclusively by the driver and mechanic.

Any car voluntarily leaving the course will be immediately disqualified.

Firms not entered in the race, but interested in the event, such as tire manufacturers, can, if they desire, occupy one of the fixed stations on the course. The area of these stations will be the same as those for the competing firms, and a rental of \$200 will be charged for two posts. These tire stations must be retained not later than May 1.

On the first day the race will start at 4 A. M.; the second day's time has yet to be fixed, but any car having four hours delay on the time of the fastest car will be refused a start on the second day.

The order of starting on the first day will be fixed by the drawing of lots, the interval between each car being one minute. The hour of starting on the second day has not yet been decided on, but the interval between each car will be that existing at the end of the first day's race.

Two men will be allowed on the course to crank each motor, but must leave it immediately this work is accomplished.

The European Circuit.

PARIS, March 24.—Eleven cars have been entered for the European circuit touring contest, including two Darracq, two Mercedes, a Wolseley, a Regina Dixi, a Dixi, and four De Dion-Bouton. One month yet remains before the closing of the entry list, during which time a bumper entry is expected.

At the present moment preparations over the 3,000 miles of the circuit are being carried on with activity. Sign posts are being placed over the entire French portion of the circuit under the direction of the General Automobile Association. Many of the posts are being given by this body, but an appeal has also been made to private enterprise with good results, several firms having promised gifts of signals, which will be placed where needed. It is hoped to be able to do likewise for the foreign portion of the circuit.

AMICABLE UNDERSTANDING.

After many meetings and discussions an agreement has been entered into between the A. C. of Great Britain and Motor Union, which will permit of united and amicable working in the future and do away with the numerous little frictions of the past. The two bodies will now uphold each other and a joint committee has been appointed to discuss any questions appertaining to the relations of club and union. This happy understanding is due to the Hon. Arthur Stanley, chairman of both bodies. The Motor Union has a present membership of 10,000; the club has 3,000 members.

THE AUTOMOBILE CALENDAR.

AMERICAN.

Shows.

- Mar. 31-Apr. 7—Baltimore Automobile Show. Baltimore Dealers' Association.
- Mar. 31-Apr. 7—Toronto (Canada) Automobile Show. Toronto Dealers' Association.
- April 4-7—Omaha Automobile Show, Auditorium. Omaha Dealers' Association.
- April 7-14—Chicago Motor Boat Show, First Regiment Armory.
- April 9-14—Canada Automobile and Motor Exhibition, Mutual Rink, Toronto.
- April 18-21—Denver Automobile Show, Coliseum Hall. Denver Auto Show Association.
- April 21-28—Canada Automobile and Motor Exhibition, Arena, Montreal.
- May 14-19—New Orleans (La.) Automobile and Motor Show.
- May 24-26—Open Air Show, Empire City Track, New York Trade Association.

Tours.

- June 6.....—Orphans' Day, Second Annual Celebration by the New York Motor Club.
- June 18-23—Second Annual Economy Test, New York Motor Club.
- July 23....—Annual A. A. A. Tour for the Glidden Trophy, starting from Buffalo or Cleveland.

Race Meets and Hill Climbs.

- April 9-12—Pablo Beach, Florida. Spring Meet Jacksonville Automobile and Motor Boat Club.
- April 19....—Boston, Annual Hill Climb, Bay State Automobile Association.
- April 25-27—Atlantic City (N. J.) Automobile Meet.
- May 10....—Wilkes-Barre, Pa., Centennial Jubilee Hill Climb.
- May 30....—Boston, Annual Meet of the Bay State Automobile Association, Readville Track.
- October 13—Vanderbilt Cup Race (probable date) Long Island Course (probable).

Motorcycle Tours and Contests.

- May 30....—Hill Climb, New York Motorcycle Club.
- May 30....—Race Meet, Chicago Motorcycle Club.
- July 4.....—Tour to Rochester, New York Motorcycle Club.
- July 4.....—Race Meet, Milwaukee Motorcycle Club.
- Sept. 3....—Race Meet, Muskegon (Mich.) Motorcycle Club.

Motor Boat Races.

- June.....—Galveston (Tex.) 100 Miles Open Race for Motor Boats. Galveston Boat Club.
- June 28....—Long Distance Motor Boat Race.
- July 7.....—Toledo (O.) Open Race for Cruising Motor Boats, 119 3-4 miles. Toledo Yacht Club.
- Aug.....—Duluth (Minn.) Motor Boat Carnival. Duluth Yacht Club.
- Aug. 21-23—Gold Challenge Cup, American Power Boat Association. Chipewewa Bay, St. Lawrence River.

FOREIGN.

Shows.

- April 1-17—Budapest Exhibition. Auto Club of Hungary.
- April 15-May 1—Marselles (France) International Automobile Exhibition.
- April 15-May—Milan (Italy) International Exhibition.
- April 28-May 6—Geneva (Switzerland) International Exhibition.
- Oct. 5-14....—Leipzig (Germany) Exhibition, Krystall Palast.
- Nov. 1-16—Berlin (Germany) Automobile Exhibition.
- Nov. 15-24—London, Olympia Motor Show.
- Nov. 23-Dec. 1—London, Stanley Show, Agricultural Hall.

Tours.

- May 6....—Targa Florio Tour (Sicily), Auto Club of Milan.
- May 12-13—International Light Touring Car Competition, Vienna to Gratz and back. Austrian Automobile Club.
- May 13-14—Tour de France. Motorcycles and voiturettes.
- May 15-16—Le Coupé d'Or and International Automobile Congress, at Milan, Italy.
- June 5-13—Herkomer Cup Touring and Speed Trials, Munich, Bavaria.
- June 11-16—Land's End to John O'Groats, Auto Cycle Club of Great Britain.
- June 13-16—Scottish Reliability Trials.
- July 29-Aug. 15—Circuit Européen, 3,000 miles, Paris, Milan, Vienna, Berlin, Cologne, Paris.

Race Meets and Hill Climbs.

- May 27....—Motor Cycle Club of France Championships.
- June 26-27—Le Grand Prix, Sarthe Circuit, France.
- June 29....—International Cup Race for Auto Cycles, Austria.
- Aug. 1-15—Circuit des Ardennes (Belgium).
- Aug. 15-16—Ventoux (France) Automobile Meeting.
- Aug. 14-19—Ostende (Belgium) Meet.
- Aug. 23....—Semmering Hill Climb.
- Sept. 27....—Tourist Trophy Race, Isle of Man, Auto Club of Great Britain.
- Oct. 7.....—Chateau Thierry (France) Hill Climb.
- Oct. 28....—Gallion (France) Hill Climb.

Motor Boat Races.

- April 1-15—Monaco (Italy) Motor Boat Races.
- April 17-19—Nice-Toulon-Nice (France) Riviera Cup Motor Boat Race.
- May 6.....—Suresnes (France) Motor Boat Meet.
- June 28-29—Kiel (Germany) Motor Boat Races.
- July 1.....—Maison-Lafitte (France) Motor Boat Races.
- July 8.....—Le Coupé Dubonnet (France) Motor Boat Races.
- Aug. 6....—Motor Boat Race on the Rhone (France).
- Aug. 16-18—British International Cup Motor Boat Race.
- Aug. 20-23—Ostende (Belgium) Motor Boat Races. Dover to Ostende.
- Sept. 16....—Juvisy (France) Motor Boat Meeting.
- Oct. 14....—Maison-Lafitte (France) Motor Boat Races.

WILKES-BARRE HILL CLIMB ENTRIES.

Entry blanks are out for the "Centennial Hill Climb," to be held at Wilkes-Barre, Pa., on May 10, under the auspices of the Wilkes-Barre Automobile Club. The entries close on May 3, with W. J. Morgan, 116 Nassau street, New York City. The entrance fee will be \$5 for each car entered up to that date. For any entries that can be received after May 3 the fee will be \$10.

There are to be eight classifications in the contest, as follows: First, free-for-all racing and stripped cars; second, stock cars costing \$1,000 and less; third, stock cars costing \$1,500 and less; fourth, stock cars costing \$2,500 and less; fifth, cars costing \$2,600 to \$3,600; sixth, stock cars costing \$5,00 and less; seventh, stock cars costing \$8,000 and less; eighth, automobile trucks of any price and power.

The term "stock car" is held to mean a car as described and shown in the maker's catalogue, which must be produced if any question is raised regarding a car entered. The only stripping from stock cars that will be allowed will be the removal of muffler and lamps, but the gear may also be changed. All cars must have an extra emergency brake, and must carry two male persons, each competent to control the vehicle.

An important rule is that any manufacturer who enters a stock machine must agree to sell it, if made an offer in cash, at the price given in the entry blank.

The prizes will consist of solid gold, silver and bronze medals made from the die commemorating the centennial of the founding of the city of Wilkes-Barre.

The contest will be held on the road up Wilkes-Barre, or "Giant Despair" mountain, which is supposed to have a gradient of 22 per cent., and is about a mile long. The mounted Pennsylvania constabulary will guard the course and preserve order, making this the first occasion in the history of American automobiling when troops have guarded a contest course.

Visiting automobilists will be received and entertained by a reception committee and will practically be given the freedom of the city, as Mayor Fred C. Kirkendall, of Wilkes-Barre, is an enthusiastic automobilist. Application for hotel accommodations should be made at least two weeks in advance of the beginning of the centennial celebration, which will last for three days. Reservations can be made through Leo W. Long, 49 Public Square, Wilkes-Barre, Pa.

ROCHESTER WANTS F. A. M. MEET.

ROCHESTER, N. Y., April 2.—Local enthusiasm is being manifested over the report that the Federation of American Motorcyclists may hold its annual meeting in this city during July. Recently the motorcyclists here organized a club which promises to develop into one of the most thriving and enterprising in the federation. It is known as the Rochester Motorcycle Club.

Sturtevant Automatic Touring Car.

The touring car manufactured by the Sturtevant Mill Co., of Boston, Mass., under the name of the "Automatic Sturtevant," embodies, in its 1906 form, several important changes, chief of which is the engine. The Sturtevant Co. has always advocated horizontal motors, and until the present season has used horizontal motors in its cars. This year, however, vertical motors of the prevailing four-cylinder type are used out of deference, the manufacturers state, to the public preference. The motor is of 50 horsepower, having cylinders of 5 1-2 inches bore and 5 inches stroke cast in pairs with integral heads, water jackets and valve housings. Inlet valves are on the right and exhaust valves on the left, all mechanically operated. Two camshafts are used and the two-to-one gears are enclosed in casings formed in the forward end of the aluminum crankcase. Ignition is by jump spark and is automatically governed, the timer and ignition governor being mounted on a vertical shaft gear-driven from the inlet camshaft. The timer and governor may be seen between the pairs of cylinders.

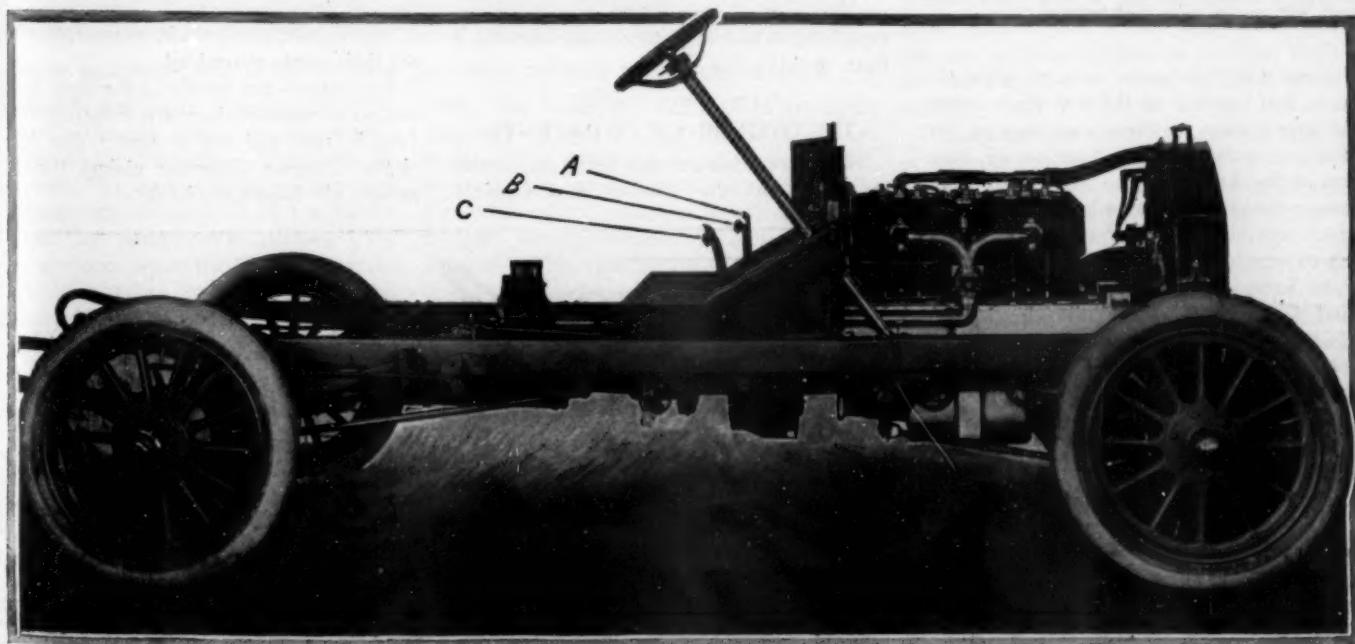
An interesting feature of the engine is the arrangement of the bearings, three in number, in which the nickel steel crankshaft runs. The steel bolts used to secure the cylinders to the crankcase are made long enough to pass down and through the bearings. The impact of the explosions is thus taken by the bolts, instead of by the crankcase. The bearings are of phosphor bronze, 2 1-4 inches in diameter and 6 inches long at the flywheel end and 2 inches in diameter and 4 inches long at the front and intermediate bearings. Bronze is also used for the crankpin bearings, which are

2 1-4 inches in diameter and 3 1-2 inches long. Lubrication is entirely automatic. Oil is taken from a hot-tank by a submerged pump and forced to the cylinders, to the main bearings of the crankshaft and, through ducts in the crankshaft and connecting rods, to the crankpins and piston-pin bearings. The oil is kept in constant circulation and is strained, while hot, each time it passes through the system.

For reducing the muscular exertion required to start the engine the exhaust camshaft slides lengthwise far enough to bring into operation special cams which relieve the compression sufficiently to make cranking comparatively easy. The starting crank is journaled to a cross member extending from one spring hanger to the other, and is well forward so that there is ample room for turning the crank, and in case a back kick occurs the operator will not be thrown against any part of the car.

The main feature of interest in the Sturtevant car is, of course, its automatically changing speed gear. This gear was described in THE AUTOMOBILE when the Sturtevant car was first brought out, and it remains the same in principle as at that time. Several changes of detail have been made, however, and these will be described in a future article. For the present it is sufficient to state that the apparatus consists of a series of three multiple disk clutches, two of the clutches driving through gears and the third driving direct. The clutches are pressed together by the action of centrifugal governor weights, the low speed engaging first and the intermediate and high speeds being taken up as the engine speed increases. As the drive is taken up by the higher gears, the lower gears over-

run, being fitted with silent roller ratchets. A foot button is connected to the carbureter throttle and thus the speed of the engine is regulated; the gears take care of themselves. If the car encounters a grade while running on the level with the high gear engaged, the extra work causes the engine to slow down. This causes the governor weights to reduce the pressure on the clutches, letting the high clutch slip until the intermediate gear takes hold and drives the car. If the grade is so steep that the motor is caused to run still more slowly, the intermediate clutch is released and the low gear takes up the drive. If road conditions should be such as to pull down the speed of the engine even on the low gear—which, with such a powerful motor, is hardly likely to occur—the low clutch will be allowed to slip enough to keep the motor turning over, and will let go altogether if the speed of the motor falls to a point where it has no practical driving power. Thus the motor cannot be stalled. If the car is ascending a slight grade with the throttle partly closed, and the gears drop back into second speed, the engine may be accelerated by pressing down the button and opening the throttle, when the increased speed will cause the high-speed gears to take up the drive. The clutch springs and governor weights are so proportioned and adjusted that the drive is always taken on the most efficient gear for the momentary engine speed. Changes of speed are gradual; one set of disks takes up the drive by degrees as the other lets go, and the point where the change is actually made cannot be felt by the occupants of the car. The complete release of the foot button or pedal causes the automatic brake, described later, to come into play, acting gradually and smoothly. In case of emergency the car can be stopped as suddenly as

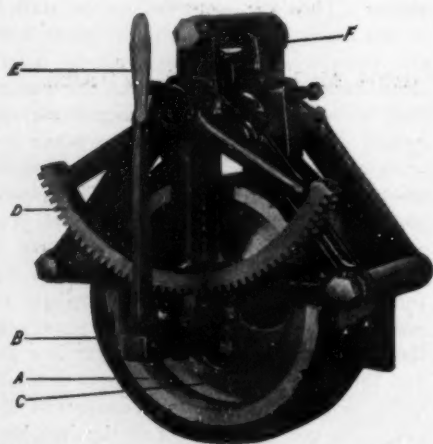


CHASSIS OF STURTEVANT TOURING CAR WITH AUTOMATICALLY CHANGING GEARS, SHOWING INLET SIDE OF 50-HORSEPOWER VERTICAL FOUR-CYLINDER MOTOR.—A, Throttle controlling button. B, reverse pedal. C, hub brake.

the momentary traction of the tires will permit.

The clutch casing, clutches and governor weights act as a flywheel, the casing being bolted direct to the crankshaft and no regular flywheel being used. The disks, gears and shafts run in a bath of oil. Reversing is effected by a sliding gear operated by a special pedal, and, of course, is not automatic.

Until this season the Sturtevant car has been fitted with pneumatic brakes. One of the new features of the 1906 car is the brake illustrated. The brake drum is mounted on an extension of the secondary transmission shaft, with which it rotates; the frame on which the other parts work is stationary with regard to the drum. The vertical lever seen in front of the apparatus is arranged so that when moved inward it causes a friction disk to be pressed against the face of the revolving brake drum. The



STURTEVANT AUTOMATIC BRAKE.

A, brake drum on secondary transmission shaft. B, brake band. C, friction disk. D, gear sector meshing with pinion on disk shaft. E, automatically operated lever carrying one end of brake band. F, pivoted lever carrying one end of brake band. There are two of these levers, one for each end of brake band, with cam on sector shaft between them.

friction disk is carried around with the drum, and a pinion on the disk shaft causes the gear sector to swing one way or the other, according to the direction of rotation of the brake drum. The sector shaft carries inside the frame a lever or cam which acts on one end of a lever, the other end of which is attached to one end of the brake band. The other end of the brake band is attached to a similar lever with which the cam comes in contact in case the drum is rotating in the opposite direction, so that the brake works equally well in either direction. It will be seen that the brake is applied by the motion of the car itself; when the car stops the brake holds until released. Pedal-operated brakes are also fitted to the rear hubs for emergency use, but the automatic brake described is relied upon for all ordinary service, and is under control of the foot button or pedal which controls the speed of the car.

Apart from the points of novelty mentioned, the car does not differ materially

from the general type of side-entrance touring car in use. The framing is of pressed steel with cross members of the same material; drive is by shaft and bevel gears to the live rear axle on which the bevel gear differential is mounted. The artillery wheels are 34 inches in diameter and are fitted with 4 1-2-inch tires. The wheelbase is 120 inches. All springs are semi-elliptic; front springs are 36 inches long and rear springs 56 inches long. A spring cushioned torsion rod takes the driving and braking stresses.

In addition to the 50-horsepower touring car the Sturtevant company builds what is called a "Flying Roadster." This is a high-powered runabout of the type that is very popular at present. In its general features and in principle of operation it is similar to the touring car; the engine is smaller, however, being rated at 30-35 horsepower, and the transmission has two speeds instead of three. The Sturtevant cars are built to order only, and the manufacturers state that changes in non-essential details can be made to suit purchasers.

Pope-Toledo Touring Runabout

A very attractive car of the new and popular "touring runabout" or "cross-country" type has been brought out by the Pope Motor Car Co., of Toledo, O., manufacturers of the Pope-Toledo cars. This machine is fitted with a motor of 20-24 horsepower and is known as Type X. The car embodies the same general features as the Pope-Toledo touring cars, including vertical four-cylinder water-cooled engine, sliding gear transmission and double side chain drive and so on. The body is built to carry two passengers, if the rear folding seat is not counted; this is intended for the use of the chauffeur in case the owner wants to drive and takes an extra passenger on board. When not in use the rear seat folds into the body, leaving a flush deck in the rear.

THE DYER GROUP OF PATENTS.

The Association Patents Company, whose acquisition of the Mueller and Canfield

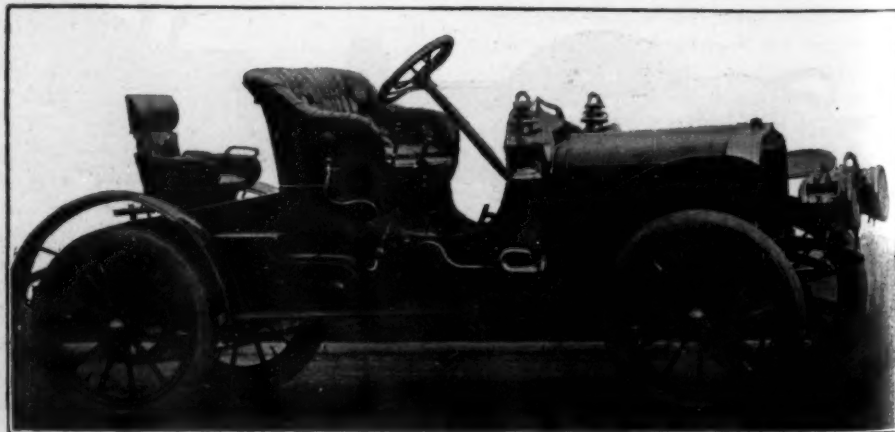


POPE-TOLEDO SHOWING REAR SEAT FOLDED.

spark plug patents was reported in *THE AUTOMOBILE* for March 29, makes a second announcement to the effect that a group of five patents, covering a number of important details of gasoline automobile construction, has been purchased.

One of the patents, No. 643,595, covers a form of planetary sliding gear with a single sliding pinion. No. 657,650 covers a selective system of levers for gear changing, with an index plate, with side plates, at the side of the car. No. 662,400 covers a transmission with a double clutch arrangement that permits the gears to be disconnected both from the engine and from the vehicle itself at the same time. No. 662,401 also covers a sliding gear arrangement; in this case a direct drive on the high speed being incorporated. No. 676,223 includes a number of claims, covering, among others, a three-point suspension system, and is said to be very comprehensive, covering the suspension from the frame of a unit consisting of the engine, drive shaft, countershaft and all their parts assembled.

The patents are known as the Dyer group and were issued to Leonard Huntress Dyer, four in 1900 and one in 1901. The Association Patents Company claims that the patents are broad and basic.



TYPE X, 24-HORSEPOWER POPE-TOLEDO SHOWING FOLDING SEAT READY FOR USE.

Leader Models for 1906.

Three models will constitute the 1906 line of "Leader" cars manufactured by the Columbia Electric Co., of Indianapolis, Ind., a concern that has been in business for only one year and which last season manufactured but one model, a runabout. All three cars will embody the same general features, differing chiefly in the size of the engine and the style of body. The largest machine, Model D, is a light touring car with double-opposed cylinder, water-cooled motor, having cylinders of 5 inches bore and 4 1-2 inches stroke, rated at 20 horsepower. The motor is placed under the body with the shaft extending across the frame and carrying the planetary transmission gear; final drive is by single chain to the live rear axle. The main frame and the sub-frame supporting the engine and transmission are of angle steel. As is usual in such motors, the cylinders are cast with heads,

The same car, fitted with a motor rated at 16 horsepower, having cylinders of 4 1-2 inch bore and stroke, is known as Model C. This machine is identical with the car manufactured by the Columbia Electric Co. for 1905.

The smallest of the three models is a runabout fitted with the same 16-horsepower motor as Model C. This car has 30-inch wheels and 3-inch tires and is practically a smaller edition of the other machines with the exception of the body, which is, of course, arranged for the accommodation of two passengers.

Good Market in Africa.

Very interesting to the trade is that portion of a recent report to the Department of Commerce by Consul-General Washington, of Cape Town, South Africa, who calls attention to the various line of American machinery and appliances that are salable

market for similar types of American autos. There were six Panhards, two of 10 horsepower, one of 8 and three of 7; one each 12-horsepower Gladiator, 14-horsepower New Orleans, 22-horsepower Daimler, 10-horsepower Lanchester, 10-horsepower Peugeot, 9-horsepower Star and 6-horsepower De Dion.

The governor of Cape Colony owns a White machine. This prominence, which is a practical trade advantage in an English colony for American-built machines, should be followed by establishment of agencies. Oldsmobiles and the Pope-Toledo car are well and favorably known, but effective agencies or salesmen are required.

Cape Town and suburbs (census, 1904) has a population of 170,000. The total white population of Cape Colony is 580,000; Natal, 97,000, and Rhodesia, with Basutoland and Bechuanaland, 15,000. all in this consular district, while the whites of entire British South Africa number 1,355,000 out of a total of 6,333,000 people.



LEADER 20-HORSEPOWER LIGHT TOURING CAR, WITH OPPOSED ENGINE UNDER BODY.

water jackets and valve chambers integral, the cylinders having flanges by which they are bolted to the crankcase. Ignition is by jump spark. The cooling water is circulated by a pump, the radiator is of the finned tube type. A water tank, holding 4 1-2 gallons, is placed under the bonnet, together with the nine-gallon gasoline tank. The axles are tubular and the springs are all full elliptics. Wheels are 30 inches in diameter and are fitted with Fisk mechanically attached tires 3 1-2 inches in diameter. The body is of the side-entrance touring type, with plenty of room for four persons; the front seats are divided. Black leather is used for the upholstery; the body of the car is finished in Brewster green and the running gear and wheels a light straw-color. The wheelbase is 84 inches and the tread standard. Each car is equipped with two gas headlights with separate generator, two oil side lamps and an oil tail lamp, set of tools and a horn.

there. He states that automobiles are now generally in use in Cape Town, and their popularity is enhanced because the people are unusually devoted to suburban life, and the motor car of moderate power and comfortable seating capacity is increasing in demand. The suburbs of the city extend five to ten miles on both sides, and are connected by good roadways. Single-cylinder machines of 6 to 8 horsepower and double-cylinder machines of 12 to 15, with seating capacity of four, at prices of about \$1,000 and \$1,500, should have a good sale. When times become somewhat better there will be a very general demand for this class of machine, and the makers first in the field with good, sound machines at these reasonable prices should do well. There is occasional demand for the more costly higher-power cars. A list of the thirteen motors used in the recent 100-mile reliability trial arranged by the Automobile Club of South Africa will best indicate the

Autos and Property Values.

That automobiles should increase real estate values and property rentals will, perhaps, seem strange at first thought, when one considers the noise, smoke and fire hazard of which complaints have been made at times by residents of houses and apartments adjacent to garages, but there is no doubt that the demand for land and buildings for salesroom and garage purposes in New York has greatly stimulated prices. This is particularly true of the upper Broadway section which has become the new "Automobile Row," extending from Times Square at Forty-second street to above Seventieth street, on Broadway. The investment in new structures designed and erected for the sole requirement of garage proprietors has been so great as to astonish even visitors from Paris, who have said that the retail establishments in New York are far superior to those of the French capital.

Despite the number of new garages erected and opened here within the last twelve months, the use of automobiles is increasing so fast that the demand for storage exceeds the facilities.

Two or three years ago the section of Broadway where the finest garages in the city now stand was given over to dilapidated little old brick and frame shops and residences two and three stories high, and there was practically no real estate activity there. All that is changed now; it is difficult to secure vacant property, rentals have doubled and tripled, and real estate men have even found it safe to erect large garage buildings on speculation, for rental to automobile agents.

Only the other day a real estate dealer said that a building formerly used as a livery stable was now bringing in double the former income, having been rented to a man who opened a garage in it.

The A. C. A. Two-gallon Test.

With a gold cup valued at \$500 as a first prize, a silver cup worth \$100 as a second prize, and a medal for third prize, the two-gallon-fuel efficiency test promoted by the Automobile Club of America promises to attract an unusual amount of interest and a record-breaking list of entrants. The committee in charge, consisting of Dr. Schuyler Skaats Wheeler, Charles G. Curtis and George F. Chamberlain, is actively engaged in arranging the details and preparing a set of rules.

Cars of any size and horsepower may compete, but the large cars will not be unduly handicapped by the small ones, despite the fact that the latter may be able to travel a greater distance on the same amount of gasoline. Weight of the competing cars, piston displacement as the prominent factor, distance traveled, general efficiency displayed and other factors which may develop, will all enter into the contest and insure a sound and logical basis for the competition.

Every car will carry an official observer, and a good deal of the success of the contest will depend upon the ability of these men. The cars will not run any great distance on two gallons of gasoline, and they will be strung out all along the course when the fuel supply is exhausted. Considerable engineering ability and a technical knowledge of automobile construction will be required of observers, and their reports in the aggregate will prove of great value.

The contest will be held early in May on a course soon to be selected.

New York Motor Club Economy Tour.

At the invitation of the Contest Committee of the New York Motor Club, which desires to arrange an ideal basis of competition for its national economy tour the week of June 18, H. H. Franklin, treasurer of the Licensed Association of Automobile Manufacturers, and the apostle of piston displacement as a basis for speed competition, has written at length to the committee his views on the matter in which he takes the stand that piston displacement is a sensible basis in racing, since it limits the engine size, but that for an economy competition it is not so practical.

"An economy contest to be successful, valuable and interesting," writes Mr. Franklin, "must be on a basis which will give all cars as they are regularly made a fair and equal chance. The basis I propose for an economy contest is the cost per ton mile, *i.e.*, a plan to determine the cost of operating each car per ton mile. This basis is simplicity as it does away with all intricate classification. Classification by weight and price cannot

be made entirely satisfactory, as it is bound to favor one car more than another. The cost of operation per ton mile is absolutely fair to each contestant and gives every class and every kind of car equal advantage. Under this plan the best car would of course show the best result.

"Cost per ton mile means cost to carry the load. In the matter of gasoline consumption it would mean the gasoline consumed per ton mile. To obtain the consumption of gasoline per ton mile, multiply the number of tons carried, *i.e.*, the weight of car and passengers, by the number of miles run on one gallon of gasoline. This will give the ton miles per gallon."

WHITE GARAGE FOR NEW YORK.

A plot of ground 100 by 100 feet on West End avenue, between Sixty-ninth and Seventieth streets, New York, has been bought by the White Sewing Machine Company for the purpose of greatly increasing the garage facilities of the New York branch. On the southern half of this property there now stands the Sherman Square Stables, a six-story building, 50 by 100 feet, of semi-fireproof construction. This building, with only slight alterations, will adapt itself admirably for garage purposes. Contracts have already been awarded for erecting on the northern half of the property an addition of equal area, three stories high. This addition is to be completed by July 1, and the building will then afford garage accommodations for 325 cars.

Added to the area of 55,000 square feet of the West End avenue property there are the 30,000 square feet of the present establishment on Sixty-second street, making 85,000 square feet devoted to White cars in the city. With a capacity for 175 cars in Sixty-second street, it will be possible to take care of 500 steamers.

The addition to be erected in West End avenue will have walls of sufficient strength for an increase in height of four or five extra stories when the additional space is required.

WELCH BRANCH OPENING.

The Welch cars, built in Michigan, now have a New York home of their own, the branch house of the Welch Motor Car Company having been formally opened last Saturday by Manager Burgoyne Hamilton. The new sales-rooms are located on Broadway above Columbus Circle. The rooms were decorated with palms and flags, luncheon was served and there was orchestral music. Two limousine cars and a chassis were on exhibition inside, while a large green touring car standing by the curb in front of the store with a placard

on the side door attracted attention by passers-by. The placard announced that the car had recently made the run from New York to the Boston show in twelve hours.

IMPORTS AND EXPORTS.

Forty-eight automobiles, valued at \$160,787, were imported during the month of February, 1906, bringing the total importation of complete cars and chassis for the eight months ended with February to 664, of a total value of \$2,430,165.

Parts to the value of \$30,765 were brought in during February. There has been an astonishing growth in the importation of foreign parts in the last year; during eight months ending with February, 1905, only \$50,582 worth of parts were brought in, as compared with \$235,570 worth during the same period ending February, 1906, or four and one-half times as many parts.

Exports of automobiles and parts from the United States continue to show a steady growth. In February, 1906, they aggregated a value of \$332,713, as compared with \$280,137 for the same month last year. For the eight months ending with February last our exports totaled \$1,771,313, as compared with \$1,402,775 for the same period a year ago, and \$1,141,371 for eight months ending with February, 1904. The exports were distributed as follows:

Exported to—	8 mos. ending	
	1906.	Feb., 1906.
United Kingdom	\$49,035	\$471,017
France.....	9,495	123,191
Germany.....	4,505	35,329
Italy.....	69,116	131,210
Other Europe.....	22,655	89,252
British North America.....	34,507	284,623
Mexico.....	21,331	166,510
West Indies and Bermuda.....	105,535	210,428
South America.....	7,551	49,041
British East Indies.....	4,215	28,364
British Australasia.....	1,481	118,846
Other Asia and Oceania....	1,164	30,910
Africa.....	695	20,875
Other countries.....	1,428	11,717
Total.....	\$332,713	\$1,771,313

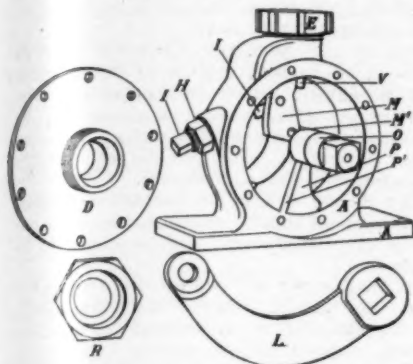
ASSIGNMENT AND REORGANIZATION.

A petition in involuntary bankruptcy was filed March 28 in the United States District Court, Brooklyn, against the Vehicle Equipment Company of Long Island City, manufacturers of electric automobiles, and Justice Thomas appointed Charles O. Dewey as receiver. The Vehicle Equipment Company was incorporated with a capital stock given at \$3,000,000, and offered as follows: President, Robert McA. Lloyd; vice-president, Hector H. Havemeyer; secretary, Arthur H. Havemeyer.

The General Vehicle Company, a new corporation, announces that it has succeeded to the business of the Vehicle Equipment Company, and will continue the manufacture of automobiles, including all classes of commercial vehicles.

Hydraulic Shock Absorber.

The internal construction of the hydraulic shock-absorbing device manufactured by P. M. Hotchkiss, 4021 Lake Avenue, Chicago, and briefly described and illustrated in outline in *THE AUTOMOBILE* for February 8, are given herewith, together with an engraving showing the component parts.



SHOCK ABSORBER WITH INTERIOR EXPOSED.

The malleable iron cylinder has, cast integral with it, the base *A*, a check valve seat covered by the bronze cap *E*, a lug for the by-pass adjusting screw *I* and a bearing for the shaft. The shaft *O* and the piston *P* are made from a single solid steel forging accurately finished so that the shaft is a close fit in its bearings and the piston in its cylinder. A bronze partition *M* is fixed in the cylinder, and through it is drilled a hole which can be partly closed by the screw *I*, held in position by the jam-nut *H*.

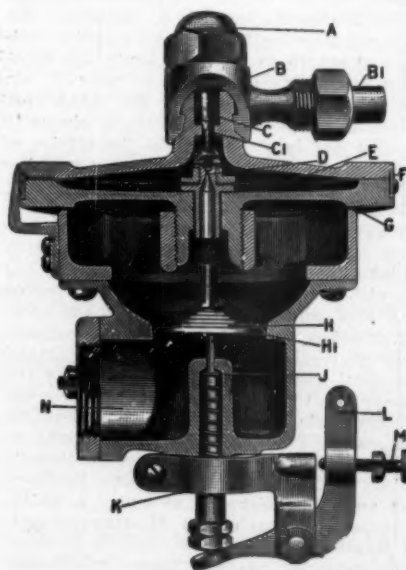
A malleable iron cover *D* closes the cylinder; integral with the cover is cast the stuffing-box and bearing for the shaft, the gland *R* being screwed on in the usual way. The outer end of the shaft is squared to take the arm *L*. Leather packings are placed in the piston where it bears against the walls of the cylinder, and in the fixed partition where it bears against the shaft. The check valve under the cap *E* is inserted in a passage which establishes communication between the two compartments formed by the fixed partition and the piston.

In working condition, the cylinder is filled with glycerine, the liquid completely filling the interior. If the arm attached to the shaft is moved so as to cause the shaft and its piston to move in a direction opposite to the movement of the hands of a clock, the glycerine in the cylinder will be forced through the main by-pass, lifting the check valve, and some will pass through the small hole in the partition, so that the piston will move freely. If the handle or arm is moved in the opposite direction, however, the check valve at once closes, and the only passage afforded the glycerine is the hole in the partition. The passage of the liquid through the hole is so slow as to greatly retard the movement of the piston and the arm on the shaft. The adjusting screw *I* allows of the passage being made larger or smaller, and thus the device can be adjusted to any car.

The device is applied to the car by attaching the cylinder, by means of the base flanges, to the spring at the center, while the arm is pivoted to a connecting rod whose other end is pivoted to a bracket on the frame of the car. The connections are so made that the retardation comes into play on the upward movement or rebound of the spring, the downward movement being free. Or, if this method of attachment is not convenient, any other way may be adopted by which the cylinder and the arm are attached, one to the spring or axle and the other to some part of the frame or the body of the car. The position of the device is immaterial. The glycerine in the cylinder will not freeze in winter, and it acts as a lubricant for the working parts.

Floatless Carbureter.

The advantages of simplicity in an accessory of such importance as the carbureter is fully recognized by both manufacturers and users, and carbureters designed with a view to combining simplicity and



CROSS SECTION OF NEWCOMB CARBURETER.

efficiency are constantly increasing in number. Among the latest is the Newcomb floatless carbureter, invented by Edward C. Newcomb and placed on the market by the Newcomb Carbureter Company, of 1900 Broadway, New York.

As its name indicates, the carbureter is without float feed. It is circular in shape, and can be readily connected to any engine. The gasoline intake, covered by a universal union *b* which is capped by universal union nut *a*, allows the intake and mixture outlet to be set independently at any angle.

The cross-section view will give the reader an idea of the working parts of the carbureter, which operates as follows: When the motor is started, a partial vacuum is produced in the carbureter proper, which communicates by the small hole in the gas-

oline nozzle *d* with the space above the diaphragm *e*. The diaphragm itself is made of a specially treated fabric, pliable, but not susceptible to the disintegrating effects of gasoline. The atmospheric pressure acting below the diaphragm forces it upward, opening the gasoline valve *c*, which seats at *ci*, and allows the gasoline to fill the space above the diaphragm, depressing same. The downward pressure continues until the flow past the valve *c* equals the flow downward through the nozzle *d*. If the demand is reduced the gasoline pressure through *c* depresses diaphragm *e* slightly and reduces the supply, thus making the carbureter automatic, as far as the fuel supply is concerned.

A mixture adjusting ring *f* encircles the section enclosing the diaphragm, and immediately below this is the adjustable annular air inlet *g*. The whole top section can be raised or lowered by turning it, and it can be set and locked at any air opening desired. The throttle valve *h*, which seats at *hi*, is adjustable by means of the lever *l*, which is in turn held in the position desired by the adjusting screw *m*. The outlet of the mixture is at *n*.

The Newcomb carbureter is made in three sizes, for motors ranging from 1-2 to 120 horsepower.

ORIGIN OF RIM TRADEMARK.

Many persons have wondered, no doubt, what were the origin and significance of the trademark herewith reproduced which is stamped on many metal rims for automobile clincher tires. Certain of the clincher tire manufacturers refuse to guarantee their products except when their tires are used in connection with rims bearing this mark. The emblem was adopted by the Clincher Automobile Tire Manufacturers' Association, of Akron, O., to be stamped on rims made to certain standard dimensions and forms to exactly fit the beads of the tires made by the tire makers in the association. It is because of this co-operation between rim and tire makers that the latter are willing to guarantee their tires when used on the rims, since the accuracy of form and size insures against rim chafing, creeping, and blow-outs. The



TIRE MAKERS' RIM TRADEMARK.

design of the trademark is a combination of a conventional representation of a section of a clincher rim and the initial letters A T M A, bifurcated vertically. The letters stand, of course, for the initials of the tire makers' association. The trademark has been registered in the Patent Office, application having been filed on May 22, 1905.

MORE COMPETITION IN CLEVELAND.

Cleveland, April 2.—After two months of cold and stormy weather, local dealers are delighted with the mild weather and evidences of spring. Since the automobile show here there have been hundreds of "lookers," but comparatively few buyers, because they did not care to invest until they could test out the cars.

A prominent dealer who has been in the business for several years says the trade conditions here are different from what they have been for several years past. For one thing, there is a great deal more competition than before—nearly a score of strong concerns and a host of smaller ones, where last year there were scarcely more than a dozen. There is also a greater demand for low-priced and medium-priced cars. Heretofore Cleveland has been noted as the center for the production and sale of high-priced cars. Anticipating this change in the character of the trade, nearly all the agents here have secured agencies for and stocked up with runabouts and light touring cars. The competition in this class of cars seems particularly keen. It is a class of trade that takes a great deal more soliciting than the cream of the business which local dealers have been skimming off heretofore. It is getting to be a straight business proposition of systematic soliciting and salesmanship.

"We have been selling all the big cars we could get," said one prominent dealer today, "and people have been coming to us eager to get a machine as soon as possible, but on the medium-priced cars and the runabouts it is different. There are plenty of people willing to buy, but we have to go after them. I might say it is getting to be almost a house-to-house and office-to-office proposition. For instance, we have been making a special canvass of the physicians, and the other fellows are doing the same thing. I went into the office of a physician who had been giving us some encouragement, the other morning, with the idea of taking him out for a ride. I found representatives of two of my competitors waiting for him in his office and another one outside.

Newspapers in Cleveland recently reported that the Studebaker Company had acquired the business of the Garford Company. It develops that this is untrue. The Studebaker interests acquired considerable stock in the Garford Company when the capital stock was increased from \$400,000 to \$650,000, a short time ago. It is said that the total increase was subscribed by the Studebaker people, but their interest is a minority one. The Studebaker Company has been devoting considerable attention of late to the development of electric commercial vehicles, which the Garford Company has also made a specialty. In fact, the recently announced plans for extensive additions to the Garford plant were made largely for the purpose of increasing their facilities in this line.

The Winton Motor Carriage Company believes there is a considerable field for the automobile in Mexico, and it has sent George Arbuckle, one of its best salesmen, to promote its interests in that republic.

PHILADELPHIA TRADE BREVITIES.

Philadelphia, April 2.—The event of last week along Automobile Row was the formal opening of the new salesrooms of the Mercedes Import Company at Broad and Race streets. Several specimens of the 1906 Mercedes were on exhibition, with music and flowers on the side. The local force of salesmen and demonstrators, under Manager H. B. Stillman, was re-enforced during the week by a detail from the parent house in New York.

The Wayne Motor Car Company has opened

a temporary office at 23 North Juniper street, where a Model B four-cylinder touring car is kept for demonstration purposes.

The local Studebaker agency, which is still temporarily located in The Motor Shop, at 317-319 North Broad street, will hereafter be in charge of Frank Yerger, formerly of the Keystone Motor Car Company, of this city.

W. H. Owen, formerly of New York City, has been appointed to the managership of the Diamond Motor Car Company, 2117-19 North Broad street, with L. E. French as assistant. This concern handles the Jackson and Cleveland cars in Philadelphia and adjacent territory.

TRADE CHANGES AT THE HUB.

Boston, March 31.—Another change in local trade circles, which with those that have been made in the course of the last year, puts an entirely new aspect upon the automobile district, is to occur the first of next week. This is the appointment of John H. MacAlman, long the manager of the Boston branch of the Locomobile Company, to the management of the Columbia Motor Vehicle Company's branch.

Several months ago W. W. Burke, the Columbia manager, was transferred to New York, and in his place was appointed F. E. Dayton. Now the company has decided to move Mr. Dayton to Chicago, where he will replace W. H. Durphy, formerly manager of the Decauville branch in Boston. Mr. Durphy is to retire from the automobile business and return to his old friends, the typewriter manufacturers. The transfer of Mr. Dayton made the opening for Mr. MacAlman. He is one of the veterans in the business in this city and is prominent in the affairs of the Bay State Association and as a member of the show committee of the Dealers' Association.

To replace Mr. MacAlman at the Boston branch of the Locomobile Company, Kenneth M. Blake has been appointed. Mr. Blake has been with the Locomobile Company for seven years, ever since the foundation of the company. He has traveled for the company during much of that time, having been abroad for several years, and also representing the company on the Pacific Coast. At present the Locomobile branch is located on Berkeley street, near Tremont, but the company is soon to move over into the newer automobile district which is centering about Boylston street and Massachusetts avenue. A building is to be occupied on Newbury street, near Massachusetts avenue. It will be much larger than the present Locomobile headquarters and much more favorably located.

Another change in local trade circles is the formation of the Lewis-Lowe Motor Car Company, composed of George H. Lowe and George C. Lewis, of the Wayne Automobile Company of New England, and Wm. M. Lewis, who will act as business manager. The new concern will handle the Logan commercial cars in New England, and will have headquarters at 5 Park square.

GEORGE SHERMAN CHANGES BASE.

George W. Sherman, the original motorcycle traveling salesman, for the past five years with the Hendee Mfg. Co., has entered upon his duties as general sales manager of the Reading Standard Cycle Mfg. Co. Prior to Mr. Sherman's departure from Springfield he was the recipient of a handsome gold watch from the Hendee Mfg. Co. as an evidence of the esteem in which he was held and in honor of his long and faithful service with that concern. He will make a specialty of advancing the interests of the motorcycle in his new position.

TRADE CONDITIONS IN CINCINNATI.

Cincinnati, April 2.—Dealers here are expecting a heavy spring business, numerous inquiries received in the last few weeks justifying that belief. A number of business firms have already placed orders for trucks and many more concerns announce that they will be in the market later. Touring cars and runabouts are also in unprecedented demand.

H. G. Van Ness, who was agent in this city for the White, died last week. He was forty-four years old. Many automobile dealers attended the funeral.

The D. T. Williams Company, carriage makers, at present located at Court street and Broadway, will erect a building for its own use on Hunt street. A garage will be established in the new building. Especial attention will be devoted to the manufacture of automobile brass trimmings.

The Sayres & Scoville Company, of Cole-rain avenue, another carriage concern, has added the manufacture of automobiles to its business.

W. H. Burtner, Jr., and others have organized the Madeau Manufacturing Company, for the manufacture of automobile tools. Its special product will be a jack upon which Mr. Burtner holds a patent. The company has not yet secured a suitable location.

The Sid Black Company has removed from East Fourth street to larger quarters on Ninth street, between Vine and Walnut. It has started a garage there and will open another in a few weeks on Walnut street, near Seventh. The company has recently opened a branch at Chattanooga, Tenn.

INDIANAPOLIS TRADE DOINGS.

Indianapolis, Ind., March 26.—Within a few weeks it is expected that a company in this city will take over the patents and stock of the Overland automobile, until a few months ago manufactured by the Standard Wheel Company.

The Standard Wheel Company closed its automobile business last fall, at a time when it was about to bring out a 1906 model. The new interests are represented by Claude Cox, of this city, and it is understood that the company will conduct its business in the formerly Overland factory, although the business will be kept separate from that of the Standard Wheel Company.

GARAGE CONSTRUCTION TO PROCEED

Chicago, April 2.—A victory for automobile men was won this week when a permanent injunction was issued restraining the city authorities from interfering with the building of the garage at Fortieth street and Grand boulevard, which is being constructed for the Stoddard-Dayton Company, of which J. H. McDuffee is manager.

Some time ago a permit was secured from the city by E. A. Munger for the erection of the garage, but, after considerable money had been expended on the structure, some of the holders of property in the neighborhood complained and the city revoked the permit.

Sidney S. Gorham, secretary of the Chicago Automobile Club and of the A. A. A., and president of the Illinois State Automobile Association, represented Mr. Munger. Judge Walker referred the case to Master in Chancery R. B. Mason, who decided that a garage is not a livery stable and that the consents of property owners on both sides of the street were not necessary for its construction, as that ordinance had been passed after the building permit had been issued. He recommended to Judge Walker that a permanent injunction be issued, which the latter did. The building of the garage will continue.

Development of Auto Stage Line Idea.

Companies in All Parts of the Country to Operate Urban and Interurban Passenger and Freight Lines.

PHILADELPHIA, April 2.—The Auto Transit Company, of Philadelphia, which applied for a sanction from City Councils last February, has applied for and been granted twenty licenses for the operation of as many vehicles on its Broad street and Diamond street lines. If the business warrants, the number of 'busses will be doubled as soon as the vehicles can be obtained. The routes to be followed will traverse the entire length of the city on Broad street, with a connecting branch on Diamond street from Broad street west to the park.

Imperial electric coaches, each seating thirty passengers, will be used.

Charles Berg, who is at the head of the new line, is vice-president and general manager of the Commercial Truck Company of America, which builds the Imperial motor.

Automobile 'Bus Service for New York.

An extensive system of automobile 'busses is to be operated in New York City by the Manhattan Transit Company which has a perpetual franchise to operate omnibuses in any city of the first-class in New York State. The franchise gives the company the right, it is claimed, to operate without consent of the city. A law has been passed since the granting of this franchise which forbids the operation of vehicles for passenger traffic without first obtaining the written consent of every property owner on the streets to be traversed, thus resulting in a practical monopoly of the privilege by the Manhattan Transit Company.

Albany Stage Line.

ALBANY, N. Y., April 2.—An auto-bus line, with a regular schedule, has been established to run between Albany and Latham's Corners, seven miles away to the north and passing through the suburbs of Loudonville and Newtonville, where many Albans have summer homes and quite a number of Albany business men have their permanent residents as citizens of the town of Colonie, which includes the above-named suburbs. Heretofore, as this section was not on a line of any trolley car or steam railroad, the residents had to keep horses and carriages. The new auto-bus line will be very popular and will be well patronized, especially in the summer.

Town 'Bus Line for New Haven.

NEW HAVEN, CONN., April 2.—A company is being organized in this city to run a line of 'buses on Orange street, one of the principal business and residential streets

of the city. Several attempts have been made to operate such a line, but they have failed.

The trolley company has made several ineffectual attempts to secure a franchise to lay tracks through this street, but in every instance has been blocked by the influence of the wealthy residents, who object to any other means of transportation than that afforded by a 'bus line.

The new company proposes to operate a line of at least four powerful electric or gasoline vehicles which will give first-class service. It has not yet decided upon the type of vehicle it will purchase, and is at present considering several makes. The company will be capitalized at \$50,000.

Stages from Camden to Atlantic City.

I. Dare Gindhart, Jr., one of the incorporators of the Camden and Atlantic Automobile Company, is authority for the statement that it has been decided to use gasoline omnibuses on the line, which it is hoped to have in operation before July 4, between the Reading Railway station at Kaighn's Point, Camden, and Atlantic City. At present the Iroquois Iron Works vehicles are looked upon with favor, but nothing definite has been done, as the promoters want vehicles that can make two round trips each day—about 220 miles. Besides the regular work of the line, which will handle through freight in addition to passengers, the company will maintain a "sight-seeing" night service at either end—at Atlantic City running to the various nearby resorts, and at the Camden end taking trips to Washington Park, a popular river resort.

A company is being organized in Lexington, Ky., to operate automobile stages between that city and Richmond, Nicholasville and a number of other towns in the Blue Grass region. It will also absorb and operate a line between Maysville and Flemingsburg, established by Thomas Powers, who is promoting the Lexington company. Thomas Dewhurst, of Lexington, is expected to have the active management of the company's affairs. One car is to be operated on each line until April 15, when it is expected to have two on each. The cars are of 60 horsepower, one inclosed and having a baggage and freight section and the other an open sight-seeing car for twenty-two passengers.

Faster grows the pace at which we live as each year rolls around. Residents of Boonville, N. Y., now complain that the electric railroads "are coming at too slow a rate for the people, who cannot afford to wait fifteen or twenty years

for their completion, that the canal is out of date and is too slow as a regulator of freight." In view of these conditions they think that it would be well for all the neighboring villages and towns to co-operate and have an improved highway over which large automobile 'buses could be run, competing with freight transportation as well as carrying passengers.

So satisfactory has been the experiment of the Union Pacific railroad with its motor car experimental service in Leavenworth, Kan., that it will soon equip the new Topeka & Northwestern railroad, running from Topeka to Marysville, Kan., with two gasoline railroad cars. Local traffic will be taken care of entirely by the new motor cars, which will leave both ends of the line each morning and make a round trip in the day.

Establishment of an automobile stage line between Manitowoc, a summer resort in Wisconsin, and Mishicott and Kewaunee, in the same state, is to be undertaken by a company at the head of which is William C. Sieker, of Milwaukee. The company will conduct a freight and passenger traffic business. There is now no line to Kewaunee except by water, and Mishicott cannot be reached except by team.

April 1 has been set as the date on which the first car will be run between Manitowoc and Pewaukee, Wis., inaugurating an automobile service. During the present month attention has been given to such preliminaries as the incorporation of the company and the purchase of equipment.

Plans are afoot in Asheville, N. C., for the establishment of an automobile line between that place and West Asheville. It is proposed to purchase a sixteen-passenger gasoline vehicle to run to West Asheville several times a day and to make one daily trip to Biltmore.

Petitions are being circulated in Benton, Mo., to secure 3,000 signatures requesting the "Frisco" railroad to operate motor railroad cars between Sikeston and Cape Girardeau, Mo., leaving the former place at 7 A. M. each morning and making two round trips a day over the railroad tracks.

A 40-horsepower automobile with accommodations for twenty passengers has been built in Buffalo and shipped to Florida to be used by the Orlando Auto Transit Co., for service between Orlando and Sanford, Fla.

Four motor cars will soon be put in operation between Lexington and Paris, Ky., by the Louisville & Nashville railroad, it is reported.

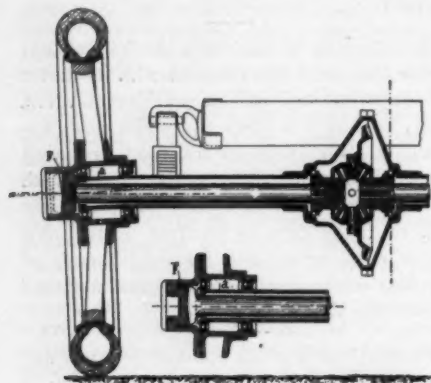
The Carrollton & Worthville railroad contemplates operating an automobile between Warsaw and Milton, Ky., to connect with its trains.

Patents

Axle Construction.

No. 815,735.—F. Pilain, of Lyon, France,

This is a rear live axle design, by which the wheels may be dished and set on a camber without necessitating the use of uni-



PILAIN AXLE CONSTRUCTION

versal joints between the differential and the axle shafts. This is accomplished in a very simple way by making the wheels run on cambered bearings *aa*, and driving them through Oldham couplings *F* of a form slightly modified to suit the conditions. The details are shown clearly in the drawing.

Gas Engine.

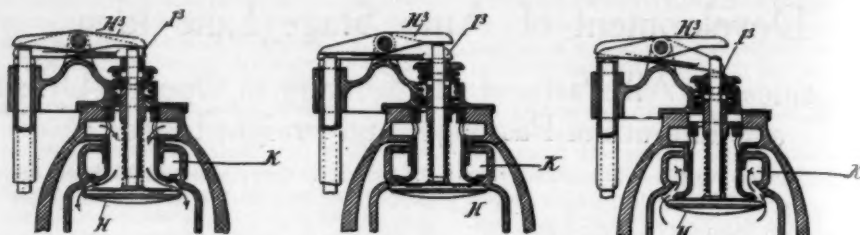
No. 815,802.—A. De Dion and G. Bouton, of Puteaux, France.

This patent covers the arrangement of water and suction pipes shown in the drawing in combination with the design of cylinder head shown. The object is to secure the utmost facility in removing both the water and suction pipes.

Valve Gear.

No. 815,779.—L. P. A. A. Bailleul, of Paris, France.

This is an arrangement of concentric inlet and exhaust valves, operated by a pair of rockers, one of which is divided so as to work on both sides of the other. The first drawing shows the fresh charge entering through the inlet valve *H*, as indicated by the arrows. In the second drawing both valves are closed, and in the third the charge is being exhausted into the annular



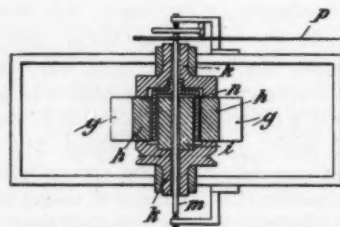
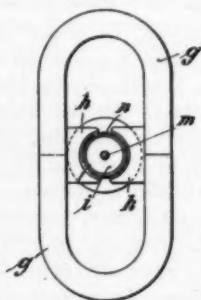
BAILLEUL CONCENTRIC INLET AND EXHAUST VALVES OPERATED BY ROCKER ARMS.

exhaust chamber *K*, as indicated by the arrows. It will be seen that, during exhaust, the two valves move together, being actuated by the rocker *P*, and during admission the rocker *H* is in action.

Speed Indicator.

No. 815,708.—G. Ihle, of Berlin, Germany,

This device operates on the principle of a permanent magnet revolving in proximity to an armature to which an indicating needle is attached. The armature is gov-



IHLE MAGNETIC SPEED INDICATOR.

erned by a spring and is rotated through a fraction of a turn by the eddy currents set up in it by the rotation of a magnetic field. In the drawing, *gg* represent the permanent magnets and *hh* their pole pieces. The armature has the form of an annulus *n* which is pivoted on the light shaft *m*, to which is attached the indicator needle *p*. Inside this annulus is an iron core *i*, which is connected to the pole pieces and rotates with them.

It serves to assist the passage of the lines of force. The magnets and the core are supported by a housing which runs in bearings *kk*, which surround but do not touch *m*.

Recharging Device for Electrics.

No. 815,360.—L. Lyndon, of New York City, New York.

This is a system for utilizing the electric motor as a rotary converter, for the purpose of employing alternating instead of direct current for recharging whenever that is convenient.

Change Speed Gearing.

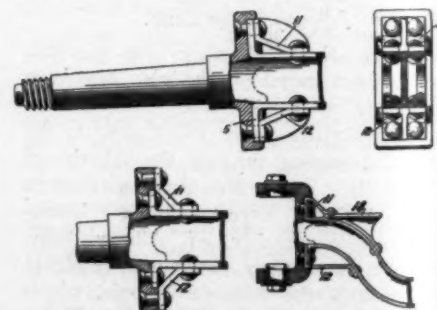
No. 815,386.—E. Soller, of Basel, and F. Hottinger, of Berne, Switzerland.

This is an individual clutch system in which claw clutches instead of friction clutches are employed. Its peculiarity is that the clutches which engage the gears are applied to both shafts, and are simultaneously operated for both shafts by connected mechanism.

Axle Design.

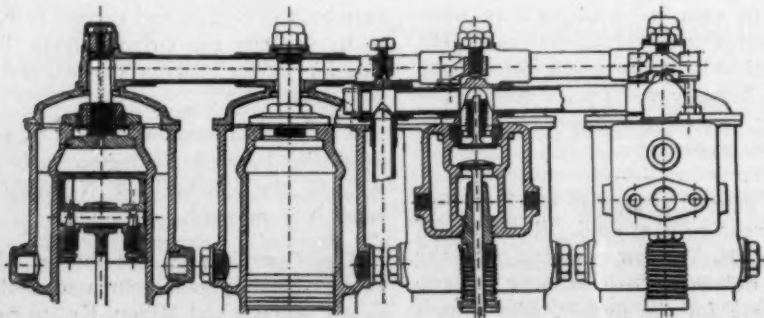
No. 815,678.—H. M. Butler, of Kirkstall Forge, near Leeds, England.

This is a design by which the central portion of the axle may be made of structural steel of I or channel section. The axle ends are forgings attached by riveting, and the subject matter of this patent is the employ-



BUTLER RIVETED AXLES AND SPINDLES.

ment of stiffening devices to reinforce the junction of the parts. The drawings show a number of designs embodying the principles of the patent. In all of them the stiffening member is represented by *11 12*, and the spring seat (if shown) by *18*. Where possible, the flanges of the central member are split from the web, and turned up at right angles, as *5*, and the web and forgings are recessed one into the other in any convenient way.



DE DION AND BOUTON ARRANGEMENT OF SUCTION AND CIRCULATING PIPES.

NEWS AND TRADE MISCELLANY

The Hampton Motor Car Company, C. H. Holmes, president, has taken the agency for the Glide cars in Hampton, N. H.

One of the effects of being freed from parental control by her recent marriage, has been the purchase of an electric car by Mrs. Nicholas Longworth.

The American Motor Car Company, of Indianapolis, has established a branch in the Motor Mart, in Boston, and E. A. Sontag has been appointed manager.

Berkshire cars will have as their representative in Boston G. J. Berg, who has secured the agency and opened a salesroom in the new motor mart in Park Square.

The George J. Scott Motor Company, 308 West Fifty-ninth street, New York City, has been appointed metropolitan agent for the Glide cars, made by the Bartholomew Company, of Peoria, Ill.

The police of Columbus, O., have been equipped with stopwatches with which to time automobilists, who, it is alleged, are flagrantly violating the eight-mile speed limit law.

The Buffalo branch of the Swinehart Clincher Tire and Rubber Company, of Akron, O., has removed from 717 Michigan street to 893 Main street, the rapid growth of business, under the management of I. A. Swinehart, requiring larger quarters.

The following is selected from a list of questions submitted in a recent examination conducted at the Winton automobile school: "On a three-cylinder, two-cycle motor, 5 1-2 by 6, how many feet will the pistons travel in five minutes at 1,000 revolutions of the crankshaft?" Try to figure it out.

W. R. Mason, who has been for more than a year sales manager for the Commercial Automobile Co., of Chicago, is now in charge of the commercial vehicle department of the Mississippi Valley Automobile Co., of 3,939 Olive street, St. Louis, Mo.

The Reading Gas Engine and Oil Company has been incorporated under the laws of Delaware, with a capital of \$200,000. The incorporators are principally from Reading, Pa. The company is to engage in the production and refining of oil, and to manufacture, set up, and operate gas engines.

The inhabitants of a small town in Western Vermont, after several seasons of automobiles, rose in wrath at the March annual town meeting and voted to prohibit automobiles on the main roads through the town, and to post the highways to that effect. Great was the consternation of these reformers upon being informed later on by a man of the law that while a man can post his private property, a highway belongs to the public, and is, therefore, as free to automobiles as to other vehicles.

Suit having been brought against the Monarch Automobile Co., of Aurora, Ill., on the ground that upon removing from Arizona to Illinois it had failed to file its incorporation papers with the secretary of state, the manager of the company, A. B. McCord, and J. J. Boucher, master mechanic at the late Monarch automobile factory, have formed a new company and secured a license to incorporate for \$150,000.

The muffler, timer and cut-off valves invented by Herbert S. Powell, of Clinton, N. Y., are to be manufactured in Utica, N. Y., the Powell Muffler & Timer Co. having established shops on the second floor of the Mechanics' building on Hotel street. It has closed a deal with Charles H. Childs

& Co., who will sell the appliances in Oneida, Herkimer, Otsego, Montgomery, Franklin and neighboring counties.

Bold color effect is the distinguishing feature of a new and attractive poster just issued by the Maxwell-Briscoe Motor Company. The central idea is a Maxwell run-about tearing along the road at a terrific pace, bearing the number "4" on its front, having distanced a competitor that lies dismantled at the roadside in the distance. The driver of the car and his fair companion, as well as the car itself, are depicted full of action.

Trade is booming in Savannah. The roads in and about the city are hard and excellent for automobiling and many women drive cars. The climate of eastern Georgia also makes the locality an ideal spot for the tourist, and when the projected road from Savannah to Jacksonville, Fla., is completed its popularity will be increased a hundred fold, as an uninterrupted highway between two of our most popular winter resorts will be established.

One of the first Ohio runs of the season was that of Mr. and Mrs. H. S. Moore, Sunday, March 25, when a trip from Cleveland to Mentor and return was made. Snow banks and suburban car tracks were the only semblances of road to be found. In many places the car tracks were the only possible road, the railroads having completely blocked the regular roadway to clear their tracks. Mr. Moore is Cleveland agent for the Stoddard-Dayton cars.

State Senator Frederick C. Stevens, of Attica, N. Y., chairman of the Gas Investigating Committee in New York City last year, is a recent purchaser of a 30-35-horsepower Locomobile. Senator Stevens spends much of his time in Washington, D. C., but his summer home is at Attica, where his big stock farm is located. Attica possesses several automobiles, and Wyoming county will apply for over 150 miles of improved roadways under the new state law.

By the election of Robert A. McKee to the presidency and George W. Cook as clerk, the management of the Hampden Automobile Company, which maintains garages in Springfield and Westfield, Mass., is now in the hands of Springfield parties. Myron A. Gilman, of Westfield, who formerly had charge of the Westfield garage, retains an interest in the company and will keep the agency for the Pone line of cars. The company is preparing for a busy season.

The tenacity of the electric vehicle in plowing its way through deep snow and mud, and in overcoming obstacles generally, is often surprising to the uninitiated observer. The electric often gets through bad places where cars employing other powers fail. The reason for this is found in the great overload capacity of the electric motor. Columbia electric in public cab service in New York operate throughout all the snowstorms every winter with less difficulty than the horse-drawn vehicles encounter.

A formidable list of owners of 30-35-horsepower Locomobiles will tour in Great Britain or the Continent during the coming summer. Walter T. Wallace, of South Orange, N. J., who has purchased his fifth machine of this make, will tour abroad extensively, as will James C. Melvin, of Boston, accompanied by his nephew, Henry J. Conant, vice-president of Westinghouse, Church, Kerr & Co., the well-known engi-

neering firm. Frank Presbrey, of New York, and E. V. Connett, Jr., of South Orange, N. J., will also tour abroad.

A novel idea in head attire for women automobilists has made its appearance, the Mon Bijou, patented and manufactured by Boehm & Levine, 561-563 Broadway, New York City. On first appearance the Mon Bijou is apparently a plain scarf made of radia silk or crepe de chine, but it can be easily and instantly transformed into a hood with a veil attached, by the simple operation of pulling two strings, and these in turn tie under the chin to fasten the veil, which can be tucked under the hood if the wearer does not desire to use it. Pulling two buttons reforms the garment again into a scarf.

The Northern Manufacturing Company, of Detroit, has received an order from President Diaz, of Mexico, for a Silent Northern 20-horsepower car with the limousine body, which will be patterned after the famous Renaud model. This car is for the exclusive use of the President's wife, and its furnishings will be of special design, embodying many novel ideas for the comfort and convenience of Mrs. Diaz. For more than a year Mexico's chief executive has owned a 20-horsepower Northern touring car. The mayor of Mexico City has also purchased a 20-horsepower Northern touring car with a regular body.

Victor Williams and Arthur Odell, the latter manager of the North Side Automobile Works, of Chicago, on a trip from Kalamazoo, Mich., to Chicago, recently, were caught in a blizzard and had an experience similar to those which Percy Megargel encountered in New Mexico. The men purchased an automobile in Kalamazoo and attempted to drive it to Chicago. When only 15 miles out of Kalamazoo they were struck by a blizzard and the machine could make no headway. The two men, almost frozen, got out and worked for an hour before they got the machine free from ice. They resumed their journey but a short time afterward struck a huge snowdrift which greatly hindered their progress. When they arrived at Chicago Mr. Odell's right ear and two of his toes were frozen.

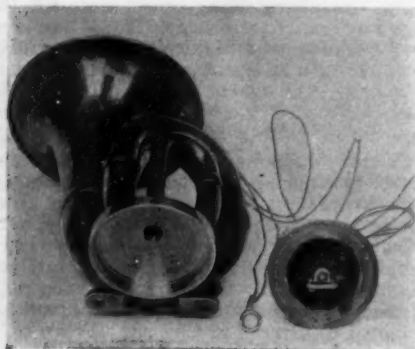
Orders for two armored cars were received last week by the E. R. Thomas Motor Co., of Buffalo. The first was from L. M. Hart, of Boston, who represents some large Western mining interests, and the second from the Giroux Consolidated Mines Co., of Los Angeles, Cal. As the Yaqui Indians are hostile in the localities of the mines, armored protection has become a necessity when automobiles are used in transporting gold from the mines to the railroad. In the two cars the system of protection varies—in Mr. Hart's, the motor and working parts as well as the driver and his cargo are encased and armed with rapid-fire guns. In the Giroux car spaces for four guards are provided with rifle racks, and slits in the armor for the rifles to be pointed through. Although the cars are heavy, they will have sufficient speed to get out of rifle range in a few minutes.

The Columbia (S. C.) State has this item: "Out at Colonial Heights an automobile is being used to run a sawmill. The machine is owned by J. C. Coulter, who is building a residence there, and by a scaffold arrangement it is attached to belting and the power turned on. The circular saw at the other end of the belting can thus be geared up to almost any speed desired, and when the work of the day is done Mr. Coulter comes back to the city in his machine."

INFORMATION FOR BUYERS.

GASOLINE SEPARATOR.—The Acorn gasoline separator is a device manufactured by E. P. Clark, 16 Arcade, Utica, N. Y., to eliminate all water and dirt from gasoline. It can be placed anywhere in the supply pipe between the fuel tank and the carbureter. It is suitable for power boats as well as for automobiles. It weighs only four ounces and can be attached in a few moments.

ELECTRIC HORN.—An attachment for sounding a horn by means of an electric current is the latest novelty brought out by the Neustadt Automobile and Supply Company, 826 South Eighteenth street St. Louis, Mo. The sound-producing medium is a vibrating diaphragm like that used in telephones. This diaphragm is vibrated by means of an electromagnet, in which the current from a storage or dry battery is made and broken by a vibrator. The vibrations are communicated to the diaphragm by a small plunger, which is seen in the accompanying engraving surrounded by a coil spring. The wires from the battery pass up through the steering column and extend out to the rim of the steering wheel, where



NEUSTADT ELECTRICALLY OPERATED HORN.

there is a switch or push button to be operated without removing the hand from the wheel. The tone of the electric horn differs from that of the pneumatic horn, but the effect is musically agreeable.

TIRE CASE.—A very light wood case made for the especial purpose of carrying an extra tire shoe, inner tubes, and small articles on the car, is offered by H. J. Russell, 32 Exchange street, Worcester, Mass. The case is made flat, and is square on one end and semicircular on the other. It is designed to set upright on the square end on the running board of the car, at the side of the driver's seat. The cover is hinged to let down flat, where it is held by light chains and forms a convenient place to lay small tools, waste, lug and valve parts, and similar articles. In the center of the case, where the tire shoe will surround it, is a circular portable packing case for clothing, lined with cloth and covered with leatherette. It is 22 inches in diameter and 4 1/2 inches deep. If preferred, the manufacturer will furnish instead a galvanized box of the same size, to be used for packing ice and refreshments. This has a drip tube draining the case to the ground.

IGNITION TIMER.—A new timer called the Dominick is manufactured by William Dominick, 243 Michigan avenue, Chicago. It has a case-hardened shaft running in bronze bearings, tool steel contact points, reversible sweep, special hard fiber, aluminum cover, and runs in grease. A special feature is the patented terminal designed to obviate trouble arising from the loosening of nuts and screws and the breaking

of the wires. The construction of this will be noted in the broken-away connection at the uppermost post in the illustration. It will be seen that this has a spring-

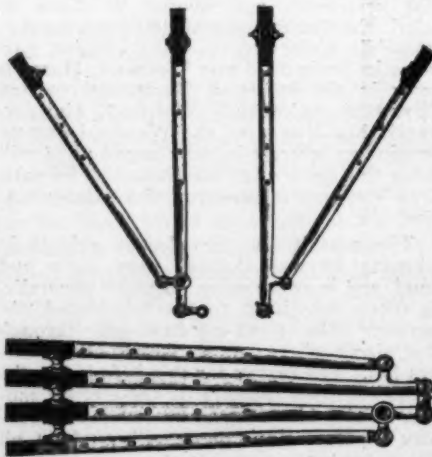


DOMINICK IGNITION CURRENT DISTRIBUTER.

pressed ball which engages a reduced portion of the terminal point and holds it in place, but at the same time permits twisting and turning without danger of breaking the wire.

AUTO POLISH.—A special preparation for cleaning and polishing the bodies and cushions of automobiles is compounded by Gilbert Leavitt, 11 India street, Boston, and marketed under the name "Leavitt's Scotch Automobile Polish Cream." It is put up in small-sized bottles and in quart, half-gallon and one-gallon cans.

METAL SPECIALTIES.—A line of metal specialties for automobiles is made by the C. W. Coops Co., 3 Appleton street, Boston, Mass. The line embraces mud guards, top bows, fender bolts, oval head screws, hexagon bronze nuts, bronze finish cap nuts, D rings, bronze bow separator-liners, U rests for folding tops, snaps and loops, and upholstering tacks. The bow separator-liners keep the top bows properly lined up and separated, and prevent chafing of the cloth and bows. They are made of bronze and polished, and are so strong that they will bend double without breaking. The ends of the bows set in sockets, which prevent



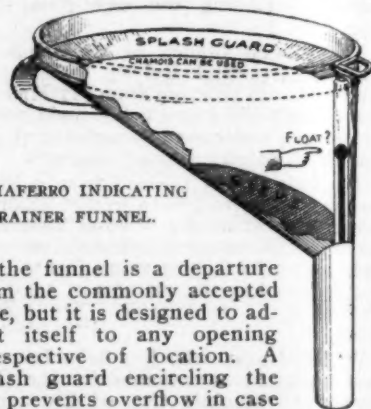
TOP BOWS WITH COOPS SEPARATOR-LINERS.

them coming loose or splitting. One of the engravings shows the front section of the top carried to the rear and the top folded back into the bow separator-liners.

DETACHABLE TREAD.—A number of improvements have been made for 1906 in the Woodworth anti-skid and anti-puncture tire covering made by the Leather Tire Goods Co., of Upper Newton Falls, Mass. The

wire rings are now made in two pieces, and the connectors are fastened to the sides of the protector, thus making the rings much more easily inserted and preventing any danger of the loops creeping and pulling against the connector. In place of the felt lining used last season there is an extra ply of leather, making the cover twice as strong as formerly. The rivets used in the tread are the same as last season, but the method of riveting in the side leather has been changed so as to give a partially flat tread, which will, the makers claim, make the cover wear more than twice as long as formerly. The rivets used on the tread surface pass entirely through the leather and come in contact with the tire, carrying off any heat that may be generated by the rubber and canvas.

GASOLINE FUNNEL.—A funnel with an index float that rises in a long glass tube which is visible from the front, showing when the tank is full enough to overflow, is the latest invention of W. A. Taliaferro, 258 Broadway, New York City. The shape



TALIAFERRO INDICATING STRAINER FUNNEL.

of the funnel is a departure from the commonly accepted type, but it is designed to adjust itself to any opening irrespective of location. A splash guard encircling the top prevents overflow in case the gasoline is poured in too rapidly and a conical screen above the neck that enters the tank deters foreign substances from passing. The funnel is made from sheet copper in a number of desirable sizes.

SPECIALTIES.—A number of automobile specialties are made by the Powell Manufacturing Company, of Utica, N. Y. Among them is the Powell pressed-steel muffler, Powell double-contact timer and Powell cut-out valve. The muffler is made of a series of pressed-steel cups designed to nest together, rods extending through the heads and sections of all holding them together. Each cup acts as an expansion chamber with a perforated baffle plate, the area of the holes in the plates being a little in excess of the area of the exhaust pipe from the engine, and no contraction is made in the perforation of the baffle plate until the last chamber is reached. The muffler is extremely rigid, though very light, so that vibrations are prevented from passing through its walls. The entire surface is utilized for cooling the gases. The Powell timer is made from a drum-shaped hollow brass casting split diametrically through the center bearing for the shaft. By unscrewing two lock-nut screws this casing can be removed without detaching the battery wires, so as to expose the center contact. Contact is made by a blade formed integral with a collar that is keyed to the timer shaft. This blade passes between two tempered steel plungers sliding in steel sockets with springs to press them outward. In case one of the contact springs breaks it will not interfere with the operation of the other, as there are two contacts, or a double contact, for each explosion of the engine.